The Greening of Red Cadres: economic development and ecological modernisation policy discourse in the People's Republic of China

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This work contains no material which has been accepted for the award of any other degree or diploma in any other university, and, to the best of my knowledge and belief, this thesis contains no material previously published or written by any other persons except where due reference is made in the text of this thesis.

Signed.....

Joseph McCarthy

Date.....08/09/19.....

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Abstract

China's economic development over the past four decades has come at considerable cost to its environment. Yet, in recent decades, the People's Republic of China (PRC) authorities have responded with a series of legislative measures consistent with principles of 'sustainable development' (可持续发展). These environmental reforms have caught the attention of ecological modernisation theorists who argue that China is undergoing form of 'ecological modernisation'. However, despite their focus on the *process* of ecological modernisation within China, there has been little scholarly attention on the influence of ecological modernisation as a *policy discourse* in China. Examining this environmental policy discourse helps to define the parameters within which Chinese authorities are prepared to act and arrest the environmental impact of rapid economic development.

This thesis argues that since the 1980s Chinese authorities have drawn on the environmental reform experience of developed nations and steadily incorporated ecological modernisation ideas into their environmental policies. Environmental bureaucratic agencies have been the key pioneers for their inclusion, although economic bureaucratic organs have also supported environmental reform measures. This has fostered a convergence of economic and environmental rationality within environmental policy discourse. However, despite these reforms, this thesis will also show how political interests, ranging from local cadres to the upper echelons of the Party, can stymie the inclusion of certain ecological modernisation ideas when these ideas challenge embedded economic and political rationalities.

The empirical material for this research is derived from an examination of policy discussions surrounding five proposed environmental policy reforms in China: 'cleaner production' (清洁生产), 'circular economy (循环经济), 'green GDP' (绿色 GDP), 'low-carbon economy' (低碳经济), and 'ecological civilisation' (生态文明). It utilises Chinese-language material from a variety of official Party and Chinese government sources: policies, legislation, speeches, articles and interviews in order to demonstrate that Chinese officials' ecological modernisation beliefs stem from their need to balance the PRC's twin guiding principles of a 'socialist market economy' and 'sustainable development'. The incorporation of 'ecological civilisation' into this policy discourse encapsulates this wish to create 'ecological modernisation with Chinese characteristics'.

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List of Abbreviations

APEC	Asia Pacific Economic Cooperation
CASS	Chinese Academy of Social Sciences
CCICED	China Council for International Cooperation on Environment and Development
CCP	Chinese Communist Party
CMA	China Meteorological Administration
CNKI	China National Knowledge Index
EMT	ecological modernisation theory
EPBs	environmental protection bureaus
FGD	flue gas desulphurisation
GDP	gross domestic product
IISD	International Institute of Sustainable Development
m^3	cubic metres
MEP	Ministry of Environmental Protection
MWR	Ministry of Water Resources
NBS	National Bureau of Statistics
NDRC	National Development Reform Commission
NGO	non-governmental organisation
NPC	National People's Congress
PRC	People's Republic of China
PSC	Politburo Standing Committee
SASAC	State-owned Assets Supervision and Administration Commission
SDPC	State Development Planning Commission

SEPA	State Environmental Protection Administration
SEPB	State Environmental Protection Bureau
SETC	State Economic and Trade Commission
SFA	State Forestry Administration
SOEs	state-owned enterprises
SPC	State Planning Commission
SSTC	State Science and Technology Commission
TVE	township village enterprise
TWh	Terawatt-hours
UNEP	United Nations Environmental Programme
WTO	World Trade Organisation

Chapter One: Introduction

In recent decades, China has experienced enormous changes throughout its society. When the Chinese Communist Party (CCP), led by Deng Xiaoping 邓小平, began its 'reform and opening up' (改革开放) initiative after the Third Plenum of the 11th Party Congress in December 1978, it set in motion a series of gradual liberal economic reforms that shook China out of its languid economic state and helped it develop into the world's second largest economy.[1] This exceptional economic rise has resulted in hundreds of millions of its citizens being lifted out of extreme poverty.[2] It has also resulted in the People's Republic of China (PRC) obtaining the financial means to undertake a military modernisation that is shifting the geopolitical balance in the Asia-Pacific region.[3] Many argue that these achievements would have been impossible without its unique and momentous economic modernisation based on market forces and advanced techniques of industrialisation.[4] Never before has a country acquired so much wealth in such a short space of time. However, the environmental *yin* to this economic *yang* is that China has achieved this remarkable economic development at an environmental cost. Its economy has utilised vast amounts of resources and has damaged China's natural ecosystems. This thesis seeks to locate itself within these changes and tensions. Specifically, it examines how officials within the Chinese government have sought to understand and reconcile the deleterious effect that their nation's economic modernisation has had on the environment.

At the beginning of this process, as the Maoist period came to a close, China was a desperately poor nation with a gross domestic product (GDP) on par with present-day Colombia.[5] Its self-vaunted planned economy during those two and a half decades was ill-equipped to provide the level of growth required to keep even eighty-five per cent of its citizens

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[1] Barboza, David. 2010. "China Passes Japan as Second-Largest Economy," New York Times, 15 August, https://www.nytimes.com/2010/08/16/business/global/16yuan.html. Accessed 22 October 2018.
[2] World Bank. 2009. "China From Poor Areas to Poor People: China's Evolving Poverty Reduction Agenda (An Assessment of Poverty and Inequality in China)," http://documents.worldbank.org/curated/en/816851468219918783/pdf/473490SR0CN-0P010Disclosed0041061091.pdf. Accessed 17 August 2018.
[3] White 2012.
[4] Naughton 2007; Garnaut, Song, and Cai 2018.
[5] GDP statistics sourced from World Bank. 2019. "World Bank Open Data," https://data.worldbank.org/. Accessed 22 July 2019.

out of extreme poverty.[6] However, with Party support for market-based and export-orientated economic development, as part of the 'reform and opening up', Chinese authorities provided the catalyst for over three decades of sustained high growth. Double-digit annual economic growth became routine with only a couple of brief instances of low or negative annual growth.[7] Its economy has grown to over US$13.6 trillion in 2018.[8] In more recent years, China's annual economic growth has fallen somewhat as its economy shifts to 'the new normal' (新常态)[9], but some experts predict that even with a forecasted six per cent economic growth, China will overtake the United States to assume the mantle of the world's largest economy in as little as four years.[10] China's last three decades of economic development have helped lift over 750 million people out of extreme poverty. It also has contributed to several hundred million Chinese citizens migrating from the farm to the factory to secure better economic opportunities in China's industrialised urban centres. The consensus is that future industrialisation will assist even more Chinese citizens to break the cycle of poverty, with the World Bank and the State Council's Development Research Centre estimating that, between 2013 and 2030, a further 210 million rural dwellers will migrate to China's cities.[11]

This industrial and urban transformation has required and will continue to require large quantities of non-renewable resources. Its industry is devouring its local reserves of iron, manganese, copper, aluminium, lead and zinc.[12] China's 'construction boom' has also

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[6] World Bank. 2010. "Results Profile: China Poverty Reduction," 19 March, https://www.worldbank.org/en/-news/feature/2010/03/19/results-profile-china-poverty-reduction. Accessed 15 October 2018.
[7] Naughton 2007, 9-10.
[8] 2018 GDP statistics sourced from World Bank. 2019. "World Bank Open Data," https://data.worldbank.org/. Accessed 22 July 2019.
[9] This is a consumption-led economy that places less emphasis on investment-led economic growth, see Zhang and Chen 2017.
[10] Standard Chartered. 2010. "The Super-Cycle Report," https://www.sc.com/id/_documents/press-releases/en/The%20Super-cycle%20Report-12112010-final.pdf. Accessed 11 February 2019; IHS Economics. 2014. "China to Become World's Largest Economy in 2024 Reports IHS Economics," 7 September, https://news.ihsmarkit.com/press-release/economics-country-risk/china-become-worlds-largest-economy-2024-reports-ihs-economics. Accessed 11 February 2019. However, this is dependent on the metrics used to measure the Chinese (and US) economy, see Fickling, David. 2019. "China Could Outrun the U.S. Next Year. Or Never," Bloomberg, 9 March, https://www.bloomberg.com/opinion/articles/2019-03-08/will-china-overtake-u-s-gdp-depends-how-you-count. Accessed 11 February 2019.
[11] Figures based on World Bank and Development Research Center of the State Council estimates that two-thirds of China's population will have migrated to urban centres, see World Bank and DRC 2013, 9.
[12] Garnaut, Ross and Ligang Song. 2007. "China's Resources Demand at the Turning Point," ANU Crawford School of Public Policy, https://crawford.anu.edu.au/pdf/china_updates/China%20Resources%20Demand%20At%20The%20Turning%20Point.pdf. Accessed 23 October 2018.

consumed enormous resources. One particular statistic highlights the urbanisation pressures underlying this construction boom: from 2001 to 2011, China built over 20 million new dwellings annually to cope with the continuous flow of rural migrants to its urban centres.[13] Because of this steady migration, China's urban planners are forced to construct entire new cities based on projected housing demand in a 'build it, and they will come' *Field of Dreams*-like strategy. This strategy has resulted in some infamous cases of planning failures, or 'ghost cities' (鬼城), such as Kangbashi, a subdivision of Ordos in Inner Mongolia, where citizens have yet to move in anticipated numbers.[14] Apart from these planning aberrations, China has needed to construct new and fully-functioning modern cities where previously there was just farmland. The result of these cities is that China, between 2011 and 2014, consumed more concrete than the United States used in the whole of the 20th century.[15] Drawing upon such resources in such prodigious quantities will be unsustainable unless Chinese society can refashion a new type of social and economic modernisation that decouples economic growth from non-renewable resources.

This urban and industrial growth has also affected China's energy consumption. China's cities are more affluent than rural areas, and increased automobile ownership is correlated with China's growing urban middle class. In 2017, over 300 million cars were registered by Chinese drivers.[16] This growth in the number of vehicles on China's roads has become the driving force behind China's growing oil consumption. For most of its history, China exported the majority of the crude oil it produced. However, in 1993, China became a net importer of oil, and it is now the largest importer of crude oil in the world. With each passing year the gap between what it consumes and what it produces grows larger.[17] Beyond increased oil consumption, all

[13] See Chapter Eight in Kroeber 2016.
[14] Shephard, Wade. 2016. "An Update On China's Largest Ghost City – What Ordos Kangbashi Is Like Today," Forbes, 19 April, https://www.forbes.com/sites/wadeshepard/2016/04/19/an-update-on-chinas-largest-ghost-city-what-ordos-kangbashi-is-like-today/#4742f6bb2327. Accessed 22 October 2018.
[15] McCarthy, Niall. 2014. "China Used More Concrete In 3 Years Than The U.S. Used In The Entire 20th Century [Infographic]," Forbes, 5 December, https://www.forbes.com/sites/niallmccarthy/2014/12/05/china-used-more-concrete-in-3-years-than-the-u-s-used-in-the-entire-20th-century-infographic/#66001a884131. Accessed 23 October 2018.
[16] Zheng, Sarah. 2017. "China now has over 300 million vehicles ... that's almost America's total population," South China Morning Post, 19 April, https://www.scmp.com/news/china/economy/article/2088876/chinas-more-300-million-vehicles-drive-pollution-congestion. Accessed 21 October 2018.
[17] In 2018, China sourced just under 440 million tonnes of crude oil from the world market (just under 70 per cent of its total oil consumption), see BP 2019. "Statistical Review of World Energy – all data (1965-2018),"

the new buildings from China's construction boom consume significant amounts of energy. In 2018, the International Energy Agency estimated that close to one-sixth of China's energy needs went towards powering and heating buildings.[18] China's total primary energy demand in 2017 was calculated at 3051 million tonnes of oil equivalent.[19] These consumption levels represent a nearly eight-fold increase from the start of the reform period in the late 1970s.[20] Industry has contributed to just under half of China's total primary energy.[21] As China continues its modernisation, it will need to become even more efficient if it wants to avoid further increasing its energy consumption.[22]

China's social and economic modernisation has created extraordinary results, but as this thesis seeks to emphasise, it was achieved at the expense of the environment beyond the issue of intensive resource use. Degrading the environment for economic ends is not a new phenomenon for China. During the Maoist years, China waged a 'war on nature' for close to three decades as it sought to undertake its socialist economic modernisation.[23] Environmental historians have also uncovered evidence that China's imperial era resulted in a literal 'retreat of the elephants' as Chinese society laid claim to vast tracts of wilderness.[24] However, those epochs pale in significance compared to the pollution and ecological destruction that China's environment has sustained after the Chinese leadership decided to welcome market-orientated development.

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https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/downloads.html. Accessed 22 July 2019.

[18] IEA 2018, 578.

[19] Ibid.

[20] Oil consumption statistics from BP 2019. "Statistical Review of World Energy – all data (1965-2018)," https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/downloads.html. Accessed 22 July 2019.

[21] IEA 2018, 578.

[22] If measured in energy used per unit of GDP (current US$), then China is over twice as inefficient than the United States. Statistics sourced from BP 2019. "Statistical Review of World Energy – all data (1965-2018)," https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/downloads.html. Accessed 22 July 2019; World Bank. 2019. "World Bank Open Data," https://data.worldbank.org/. Accessed 22 July 2019.

[23] Shapiro 2001.

[24] Elvin 2004.

The result of this modernisation is that China now contains many of the world's most polluted cities, rivers and countryside.[25] The tools and resources that achieved this unprecedented modernisation may have brought economic prosperity, but they have also wrought considerable environmental damage by fouling all spheres of China's environment. China's remarkable economic modernisation may also have allowed its citizens to lead more progressively prosperous lives, but that increased affluence has resulted in the adoption of Western consumption patterns and behaviours ill-suited to the ecological limits of China's environment.[26] Moreover, this same modernisation may have increased the life expectancy of a Chinese citizen by a couple of decades, but longer lives mean that China contains more people who negatively impact the environment over a longer period. Despite the strict implementation of a 'one-child policy' in the 1980s, China's population has still risen by more than 400 million people in under four decades with each Chinese birth increasing the country's ecological footprint.[27] This footprint had already overshot China's biocapacity in the early 1970s but it has steadily increased in recent years predominantly because of increased greenhouse gas emissions, mainly carbon dioxide, caused by economic development. In 2014, the non-governmental organisation (NGO) Global Footprint Network calculated China's ecological footprint per capita at over 3.7 global hectares an ecological deficit of 2.6 global hectares, with regard to its present biocapacity (see Figure 1.1).[28] Even so, China's modernisation has marched on regardless of the ecological carrying capacity of its land.

[25] Kuo, Lily. 2018. "China 'environment census' reveals 50% rise in pollution sources," The Guardian, 31 March, https://www.theguardian.com/world/2018/mar/31/china-environment-census-reveals-50-rise-in-pollution-sources. Accessed 23 October 2018; Stanway, David. 2019. "China soil pollution efforts stymied by local governments: Greenpeace," Reuters, 17 April, https://www.reuters.com/article/us-china-pollution-soil/china-soil-pollution-efforts-stymied-by-local-governments-greenpeace-idUSKCN1RT04D. Accessed 22 June 2019.

[26] Kahn, Matthew. 2016. "As incomes rise in China, so does concern about pollution," The Conversation, 25 October, http://theconversation.com/as-incomes-rise-in-china-so-does-concern-about-pollution-65617. Accessed 23 October 2018; Poulden, Gervase. 2011. "China exports its environmental problems as consumer culture booms," Ecologist: A Journal for a Post-Industrial Age, 6 September, https://theecologist.org/2011/sep/06/china-exports-its-environmental-problems-consumer-culture-booms. Accessed 23 October 2018.

[27] For details on China's 'one-child policy' see Greenhalgh and Winckler 2005. Population statistics from World Bank. 2019. "World Bank Open Data," https://data.worldbank.org/. Accessed 22 July 2019.

[28] Global Footprint Network. 2019. "Country Trends," http://data.footprintnetwork.org/#/countryTrends?cn=5001&type=BCtot,EFCtot. Accessed 23 June 2019.

Air pollution has also become an increasingly pressing concern.[29] The increased automobile ownership mentioned earlier has granted China's car owners the freedom and independence to travel in a manner incongruent with past Maoist-levels of control, but the proliferation of cars has clouded many of China's largest cities in deadly photochemical smog and has led to increased respiratory diseases for many urban inhabitants.[30] Moreover, while China's coal-fired power stations have helped power more and more households and factories, critically underpinning China's modernisation, the coal used to fuel these power plants has steadily increased airborne and solid waste emissions, clouding the atmosphere (and covering the landscape) in toxic coal-ash and heavy metals.[31] China has created some of the most advanced cities in the world, but the means to achieve that modernisation has shrouded many of those cities in carcinogenic smog.[32] China's longstanding air pollution problems were famously epitomised by Beijing's 'Airpocalypse' in 2013 when China's capital endured two weeks of particulate matter levels 20-times in excess of the World Health Organisation stipulated safe levels.[33] That same year an Asian Development Bank and Tsinghua University report listed seven Chinese cities within the world's ten most polluted cities based on air pollution.[34]

Intensive resource use also has brought negative environmental impacts to China's soils and river systems. China's mines may have supplied the fuel and minerals needed for China's modernisation, but in many cases their extraction methods have scarred the landscape and polluted its soils and waterways with toxic heavy metals that will linger in some cases for

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[29] Lu, Hai. 2018. "Xi vows tough battle against pollution to boost ecological advancement," Xinhuanet, 19 May, http://www.xinhuanet.com/english/2018-05/19/c_137191441.htm. Accessed 23 October 2018.
[30] Kao, Ernest. 2018. "Air pollution is killing 1 million people and costing Chinese economy 267 billion yuan a year, research from CUHK shows," South China Morning Post, 2 October, https://www.scmp.com/news/china/science/article/2166542/air-pollution-killing-1-million-people-and-costing-chinese. Accessed 24 October 2018.
[31] Chen, Stephen. 2016. "What exactly is causing China's toxic smog?," South China Morning Post, 21 December, https://www.scmp.com/news/china/policies-politics/article/2056366/what-exactly-causing-chinas-toxic-smog. Accessed 23 October 2018.
[32] Pearce, Fred. 2018. "How a 'Toxic Cocktail' Is Posing a Troubling Health Risk in China's Cities," Yale Environment 360, 17 April, https://e360.yale.edu/features/how-a-toxic-cocktail-is-posing-a-troubling-health-risk-in-chinese-cities. Accessed 23 October 2018; Rapoza, Kenneth. 2015. "China Bans Cars As Air Pollution Hits Red-Alert Status," New York Times, 8 December, https://www.forbes.com/sites/kenrapoza/2015/12/08/china-bans-cars-as-air-pollution-hits-red-alert-status/#dddc3b3dce1b. Accessed 23 October 2018.
[33] Kaiman, Jonathan. "Chinese struggle through 'airpocalypse' smog," The Guardian, 17 February, https://www.theguardian.com/world/2013/feb/16/chinese-struggle-through-airpocalypse-smog. Accessed 23 October 2018.
[34] Taiyuan, Beijing, Urumqi, Lanzhou, Chongqing, Jinan and Shijiazhuang, see China.org.cn. 2013. "Top 10 most polluted Chinese cities in Q3," 23 October, http://www.china.org.cn/top10/2013-10/23/content_30376739.htm. Accessed 22 October 2018.

millennia.[35] Copper smelters may have helped supply the wiring to electrify China, but their noxious fumes have poisoned China's soils and waterways, harming life right down to the most

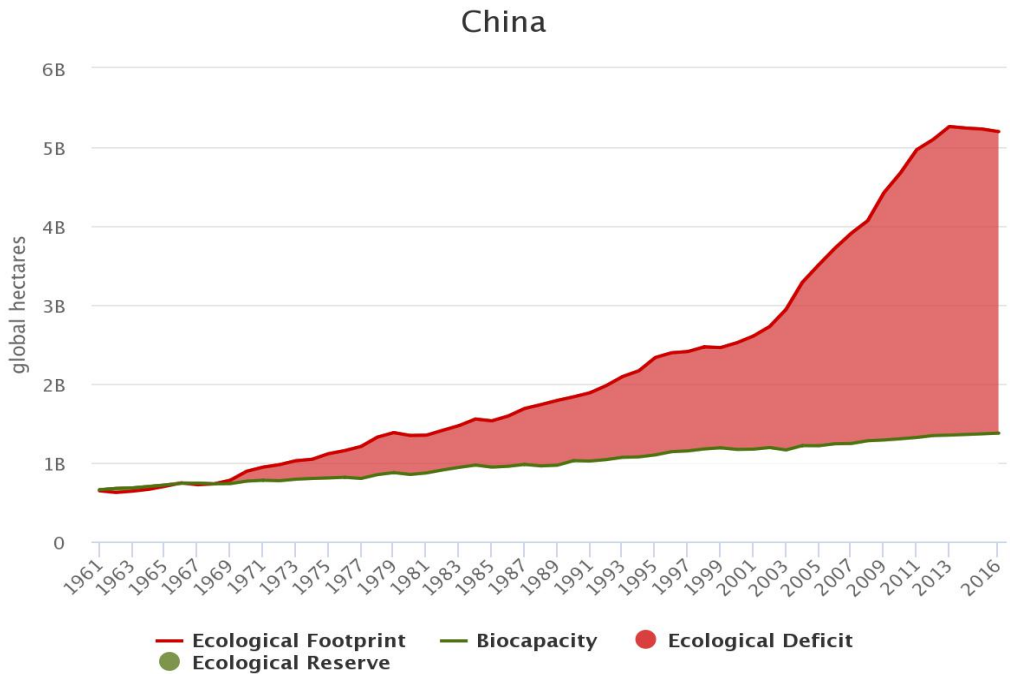

Figure 1.1: China's Ecological Footprint[36]

basic bacterial life forms.[37] Fertilisers have allowed Chinese farmers to grow increasingly larger yields from their nutrient-depleted soils, but the phosphorus and nitrogen runoff from these farms has led to eutrophication and algal blooms that have crowded out native biota.[38] Dams and canals have blocked and diverted rivers allowing more and more hectares of irrigated

[35] Gao, Shengke and Kai Wang. 2013. "The houses built on China's 'poisoned' land," China Dialogue, 5 June, https://www.chinadialogue.net/article/show/single/en/6070-The-houses-built-on-China-s-poisoned-land. Accessed 24 October 2018.
[36] Global Footprint Network. 2019. "Ecological Footprint: China," http://data.footprintnetwork.org/#/. Accessed 23 June 2019.
[37] China Water Risk. 2018. "Pollutions and Crops," http://www.chinawaterrisk.org/the-big-picture/pollution-crops/. Accessed 24 October 2018; Yang, Chunmian. 2011. "Toxic mine spill was only latest in long history of Chinese pollution," The Guardian, 14 April, https://www.theguardian.com/environment/2011/apr/14/toxic-mine-spill-chinese-pollution. Accessed 23 October 2018; Tan, Deborah. 2014. "The State of China's Agriculture," China Water Risk, 9 April, http://www.chinawaterrisk.org/resources/analysis-reviews/the-state-of-chinas-agriculture/. Accessed 20 January 2018.
[38] 2015. "China wants zero growth in the use of polluting chemical fertilisers by 2020," South China Morning Post, 18 March, https://www.scmp.com/news/china/article/1740896/china-wants-zero-growth-use-polluting-chemical-fertilisers-2020. Accessed 24 October 2018.

farmland, with the added benefit of flood control, but those same dams and canals have led to more saline and sediment-laden rivers such as the Yellow and Yangtze rivers. Factories may have employed millions of Chinese workers, but the at times untreated effluent from these factories has poisoned China's rivers and inlets. In 2017, an official from the Ministry of Environmental Protection[39] (MEP) revealed that around 85 per cent of China's 40 million tonnes of 'hazardous waste' is disposed of through general waste channels. This has led to the leaching of toxic chemicals into soils and rivers and air pollution by way of illegal dumping.[40] In 2014, the MEP and Ministry of Land Resources released the results of a national soil pollution survey following public pressure (it was previously classified as a 'state secret' 国家秘密). The report revealed that 20 per cent of China's soils were contaminated with a variety of hazardous heavy metals.[41]

The same fossil fuels used in China's automobiles and coal-fired power plants have also severely exacerbated its carbon dioxide emissions, harming global efforts to prevent anthropogenic climate change. Figure 1.2 and 1.3 shows this correlation between rising carbon dioxide emissions and increased oil and coal consumption. In 1965, China contributed less than five per cent of total carbon dioxide emissions despite constituting one-fifth of the total global population. Now with increased oil and coal consumption, as the result of its rapid modernisation, China contributes over one-quarter of all carbon dioxide emissions with its 2017 emissions tallied at 9,232.6 million tonnes.[42] If the global community wants to keep atmospheric levels of carbon dioxide below 450 million parts per million in order to prevent global temperature rises of over two degrees Celsius, then China must reduce its reliance on these fossil fuels that so far have successfully fuelled its modernisation. If the one-fifth of

[39] Chinese name is 国家环境部.
[40] Qu, Qiuyan. 2017. "85% of hazardous waste in China not being treated properly: expert," Global Times, 8 August, http://www.globaltimes.cn/content/1061302.shtml. Accessed 23 October 2018; 2018. "China's war on pollution targets illegal waste dumping," South China Morning Post, 11 May, https://www.scmp.com/news/china/society/article/2145741/chinas-war-pollution-targets-illegal-waste-dumping. Accessed 23 October 2018.
[41] Wang, Yue. 2014. "Almost one-fifth of our arable land is polluted, admit Chinese officials," China Dialogue, 17 April, https://www.chinadialogue.net/blog/6921-Almost-one-fifth-of-our-arable-land-is-polluted-admit-Chinese-officials/en. Accessed 23 October 2018.
[42] Statistics from BP 2019. "Statistical Review of World Energy – all data (1965-2018)," https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/downloads.html. Accessed 22 July 2019.

humanity residing in China disregards the risks of carbon-based development, then it is predicted that the earth will descend into a 'hothouse earth'.[43]

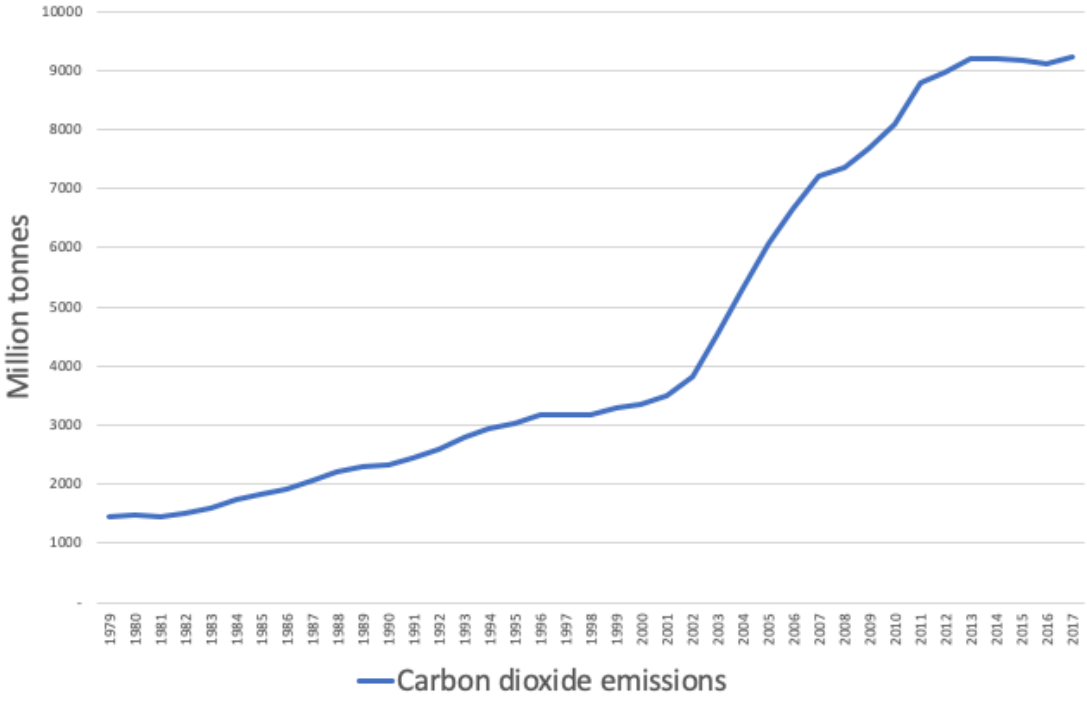

Figure 1.2: China's Carbon Dioxide Emissions (1979-2017)[44]

China's environmental problems are not unique. Western developed nations and Japan experienced similar environmental issues during their industrial phases, and their ongoing development still negatively impacts their local (and the global) environment.[45] Yet, the difference with China's industrialisation is that it has occurred within a highly populated country of 1.4 billion people. Furthermore, because of the rapid pace of China's economic modernisation, its environmental issues have become magnified beyond anything any other country has experienced in human history. It has also transpired in an age that still has not found a comprehensive and workable solution for 'sustainable development'. So, with this in

[43] Steffen et al. 2018.
[44] Carbon dioxide statistics from BP 2019. "Statistical Review of World Energy – all data (1965-2018)," https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/downloads.html. Accessed 22 July 2019.
[45] Namely through high carbon-dioxide emissions, see Rapier, Robert. 2018. "China Emits More Carbon Dioxide Than The U.S. and EU Combined," Forbes, 1 July, https://www.forbes.com/sites/rrapier/2018/07/01/china-emits-more-carbon-dioxide-than-the-u-s-and-eu-combined/#537a0221628c. Accessed 23 October 2018.

mind, the relevant question is, how have China's authorities responded to the negative consequences of their country's economic modernisation?

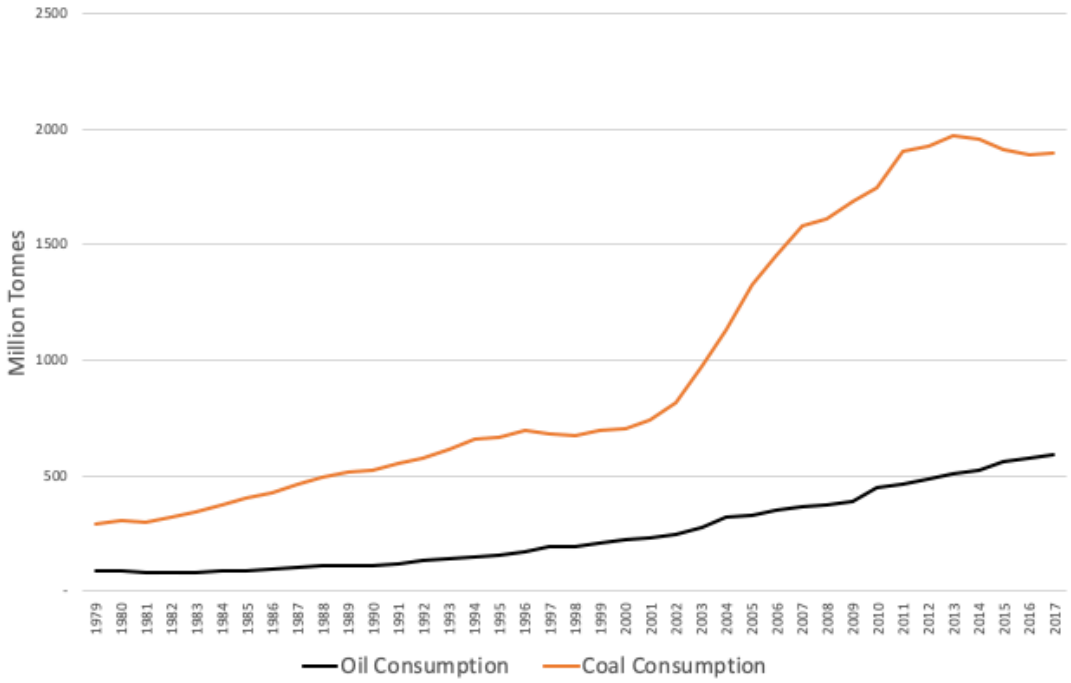

Figure 1.3: China's Oil and Coal Consumption (1979–2017)[46]

Since the early 1970s, China's leaders progressively have appreciated that China's economic modernisation negatively impacts the environment and they resultingly have created a set of institutions, legislation, policies, and principles in order to 'protect the environment' (保护环境). For instance, China established its first environmental protection law in 1979, converting it from a 'trial law' (试行) to an established permanent law a decade later.[47] Other laws have sought to tackle air, water, and solid waste pollution, encourage cleaner production and circular economies, improve environmental impact assessments, conserve energy, and promote renewable or clean energy.[48] In 1994, the State Council formally endorsed 'sustainable development' as one of China's guiding principles.[49] Chinese authorities have

[46] Coal and oil consumption statistics from BP 2019. "Statistical Review of World Energy – all data (1965-2018)," https://www.bp.com/en/global/. Accessed 22 July 2019.
[47] Ferris Jr. and Zhang 2005, 76-78.
[48] Qin and Meng 2017.
[49] Guowu yuan. 1994. "Guowuyuan guanyu guanche shishi Zhongguo 21 shiji yicheng – Zhongguo 21 shiji renkou, huanjing yu fazhan baipishu de tongzhi" (Notice of the State Council on implementing China's Agenda 21 – China's white paper on population, environment and development in the 21st Century), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid=d8f6542c980cd81dbdfb. Accessed 17 May 2018.

allowed a variety of non-government stakeholders to involve themselves increasingly in matters of environmental protection, such as civil society and the media, even if there are limitations to their involvement and many instances where state actions defy the non-governmental groundswell for increased involvement. The 'opening up' (开放) of China to foreign influences has given rise to numerous international stakeholders (governments, NGOs, and multinationals) collaborating with Chinese organisation on a wide variety of sustainability projects associated with environmental protection. Clean energy investment has also grown markedly in recent years. Furthermore, the relaxation of social controls combined with rising discontent towards environmental issues has seen Chinese citizens becoming more actively involved in environmental concerns, whether protesting in person or online. The Chinese government permits this, as long as these protests refrain from attacking the CCP's political legitimacy.[50]

China's leaders themselves have become increasingly vocal about the threat of environmental pollution and the need for a more sustainable path. Western media often point to Premier Li Keqiang's 李克强 remarks at the Third Plenum of the 18th National Party Congress in March 2013 that China needed to 'wage war on pollution' (向污染宣战) and his comments two years later that pollution in China was 'weighing heavily on the will of the people' (民心之痛).[51] Chinese President Xi Jinping has called for the construction of a 'beautiful China' (美丽中国) with 'blue sky, green vegetation and clear rivers, so that the people will enjoy life in a liveable environment with the ecological benefits created by economic development'.[52]

In recent years, this new institutional environmental awareness (along with Chinese authorities' efforts to combat environmental pollution through laws, institutions, and more

[50] Ho and Edmonds 2007, 332; Jing 2010.
[51] Di Yuxi. 2014. "Li Keqiang zhengfu gongzuo baogao xiang huanjing wuran xuanzhan" (Li Keqiang's government work report declares war on environmental pollution), Niuyue shibao zhongwen wang, 6 March, https://cn.nytimes.com/china/20140306/c06smog/. Accessed 25 October 2018. Xinhua she. 2015. "Shengtai yu shengcun, Zhongguo zai "jiannan de pingheng" zhong xun lu (Ecology and survival, China finds a way to "balance difficulties"), 6 March, http://www.xinhuanet.com/politics/2015-03/06/c_1114544279.htm. Accessed 25 October 2018.
[52] Phillips, Tom. 2016. "China ratifies Paris climate change agreement ahead of G20," The Guardian, 3 September, https://www.theguardian.com/world/2016/sep/03/china-ratifies-paris-climate-change-agreement. Accessed 25 October 2018.

relaxed controls on civil society and media) has caught the attention of ecological modernisation theorists. This optimistic group of environmental sociologists observed sociological phenomena in China that bore many similarities to the environmental reform and 'ecological restructuring' of Western European societies from the 1970s onwards.[53] Led by Dutch sociologist Arthur Mol, some ecological modernisation theorists believe that China has commenced a process characterised by 'the centripetal movement of ecological interests, ideas and considerations within the social practices and institutional developments of modern societies'.[54] While Mol acknowledges that China's environmental reform exhibits many unique contextual factors and differs in many respects from Western Europe's environmental reform, he still argues that 'most environmental reform initiatives [in China] are firmly based on, make use of and take place within the context of China's modernisation process. In that sense, it seems justified to use the term "ecological modernisation" to describe China's attempts at restructuring its economy along ecological lines'.[55]

In opposition to those views, other commentators have been less optimistic about Chinese environmental reform and ecological restructuring. For instance, Chinese environmental sociologist Huan Qingzhi 郇庆治 from Peking University argued in the pages of *Environmental Politics* that he was 'not fully convinced that ecological modernisation' should conceptually frame China's sustainable modernisation.[56]

Given these positions, the question remains: can ecological modernisation shed light on the environmental reforms and transformation underway in China? In particular, this question needs to be considered given the increasing environmental awareness that Chinese officials are showing towards environmental issues and their apparent wish for legislative and policy solutions that balance economic and ecological objectives.

This thesis will utilise a discursive reading of the concept of ecological modernisation in order to explore the interaction between ecological modernisation and China's environmental policy agenda. This version of ecological modernisation treats the concept not as a societal

[53] Carter and Mol 2006; Mol 2006.
[54] Mol 2006, 33.
[55] Ibid, 51-52.
[56] Huan 2007, 686-687.

process of environmental reform, but as a 'story-line', 'ideology', 'belief system' or 'discourse' that emerged first in West Germany and the Netherlands arguing that that end-of-pipe approaches to pollution control were ineffective.[57] This led to a growing consensus among political parties, bureaucracies, companies, scientists and NGOs that the right mix of policies and values could promote continued economic growth in a way that would be environmentally sustainable and within ecological limits.[58] This ecological modernisation approach will be explored in greater detail during Chapter Two, but at this point in my introduction, I can already pose the question: have Chinese officials also sought to use ecological modernisation ideas to frame their environmental reform measures?

Many studies suggest that *prima facie* evidence exists for the incorporation of ecological modernisation ideas within China's environmental policy agenda.[59] For instance, Mol and a number of his colleagues noted that 'in general, ecological modernisation gets along well with the concepts that are currently popular and promoted in China, including the circular economy (namely, industrial ecology), green GDP (full cost, environmental accounting), cleaner production, and harmonious development'.[60] Mol in 2015 even briefly discussed "(reflexive) ecological modernisation" as one of the sustainable discourses in China.[61]

As China continues its modernisation, its society and economy will place further stress on the environment. Therefore, it is important to examine the extent to which ecological modernisation ideas guide Chinese policymakers. Their decisions will influence the future of China and the world. For the discipline of environmental sociology, discursively applying 'ecological modernisation' to China provides for more thorough appreciation for the extent to which ecological modernisation ideas shape policymakers in developing countries.

Thesis Structure

In order to examine the influence of ecological modernisation ideas on China's policy discourse, this thesis is structured into the following nine chapters. Chapter Two locates the research problem for this thesis. It firstly reviews the literature on the impact of China's modernisation on the environment, paying particular attention to the Maoist (1949–1976) and

[57] Weale 1992; Hajer 1995; Christoff 1996; Dryzeck 2013.
[58] Langhelle 2000, 303; Seippel 2000, 288-289.
[59] See Mol 2006; Carter and Mol 2006.
[60] Zhang, Mol and Sonnefeld 2007.
[61] Mol 2015, 356-358.

Reform (1979–present) eras, laying a scholarly foundation for the central theme of the thesis: how have Chinese authorities responded to the contradictions of their economic development? Chapter Two then discusses the societal eco-restructuring and environmental reforms that have occurred under the political leadership of the CCP, and how these changes have garnered the interest of ecological modernisation theorists. The rest of Chapter Two outlines the distinction between the process of ecological modernisation and the discourse of ecological modernisation, speculating that a constructivist reading of this concept could provide a useful conceptual framework to explain the types of environmental reform measures that Chinese authorities have undertaken over the past few decades.

The next two chapters provide the methodological and empirical foundation for this thesis.

Chapter Three details the research methods that assist in answering whether ecological modernisation has been incorporated into China's environmental policy agenda. It starts with a personal reflection that justifies the decision to utilise a discursive take on ecological modernisation and the selection of the five case studies. The chapter then details the process utilised for operationalising ecological modernisation and answering the research questions of this thesis.

Chapter Four provides an empirical context for this thesis. It firstly details the political milieu in China and how that influences the country's environmental policymaking, detailing the importance of the CCP, the role of the Chinese government and National People's Congress, the fragmented aspect of China's bureaucracy and the factional nature of Chinese politics. The second part of Chapter Four outlines the contextual economic backdrop to the exploration of China's environmental reform measures. It outlines how China's economy, politics and society have witnessed changes in its 'ecological rationality', with the introduction of a capitalist mindset (or capitalist 'economic rationality') in China that has gradually privileged maximising efficient and profitable production.

Chapter Five to Chapter Nine detail the empirical findings and analysis of this thesis by examining five key environmental reform measures in China: cleaner production, circular economy, green GDP, low-carbon economy and ecological civilisation. The main analytical questions that guide these chapters are where, why, and how China's environmental reform ideas originated, and the extent to which they reflect the ideas of ecological modernisation. These chapters are chronological, yet due to the complex nature of China's environmental

issues and policy, various environmental ideas appear multiple times across chapters. Each chapter builds upon the other to demonstrate the evolution and progression of environmental reform in China.

Chapter Five explores the origins of 'cleaner production' and how this concept emerged out of a growing 'ecological rationality' amongst government officials towards industrial pollution, balanced with the need to continue China's industrialisation.

Chapter Six examines the idea of the 'circular economy', situating its maturation within the growing unease within China towards population growth, solid waste and industrial pollution, and new thinking on how to reduce the resource use and waste in China in a manner that is coherent with China's 'socialist market economy'.

Chapter Seven scrutinises the policy measure of accounting for China's development with a 'green GDP' metric that seeks to achieve 'sustainable development'. It also analyses the failed implementation of green GDP within the broader issue of political interests in China.

Chapter Eight examines 'low-carbon economy'. It investigates the calls for low-carbon development within policymaking circles and shows that these calls stem from the desire to reduce China's carbon footprint in a manner that allows China's economy to continue growing, as well as the wish to avoid future economic losses of climate policy inaction.

Chapter Nine will explore the latest environmental reform concept in China, 'ecological civilisation', suggesting that this capstone concept reflects a manifestation of 'ecological modernisation with Chinese characteristics' within China's environmental policy discourse.

Chapter Ten summarises the findings of this thesis. It argues that the notions of ecological modernisation have diffused into most policymaking circles of China's party-state system. Ecological modernisation beliefs stem from a need to balance the PRC's twin guiding principles of a 'socialist market economy' and 'sustainable development'. The recent incorporation of 'ecological civilisation' into this policy discourse encapsulates China's aim to create 'ecological modernisation with Chinese characteristics'. Understanding the environmental rationales that guide China's policymakers can assist researchers in more accurately grasping the policy processes that lead to new environmental policy reforms in China.

Chapter Two: Literature Review

As noted in the introductory chapter, although China has achieved remarkable economic success in the past four decades, it also has experienced severe ecological crises that have impacted all parts of its biosphere. Whether these issues are toxic chemicals leaked into the Song River in 2005, 15,000 pig carcasses floating down the Huang Pu River in 2013, or deadly air containing particulate matter more than 25 times the World Health Organisation's stipulated safe levels blanketing Beijing for two weeks in 2013, China's economic development has been far from an environmentally-benign process.[62]

Within that empirical context, this chapter will examine the history of China's environmental problems, exploring the literature relating to the environmental problems of the Maoist (1949–1976) and Reform (1979–present) periods. It will then examine research that explores how Chinese society and authorities responded to the growing environmental impact of China's modernisation, especially by focusing on the arguments surrounding the efficacy of environmental governance in China. The third section of this chapter builds on the preceding sections to examine a critical sociological question relevant to China, namely, do China's environmental reforms provide evidence of ecological modernisation? The fourth section examines the constructivist readings of ecological modernisation and proposes that this conceptualisation of ecological modernisation can shed light on the environmental changes transforming China's politics and society. The chapter will close by drawing out the research problem and detailing the questions and hypotheses that frame this thesis.

Environmental Degradation in Maoist China

Although China's environmental problems are longstanding, they have only attracted recent widespread international media headlines after incidents such as Beijing's 2013 'Airpocalypse'

[62] Green, Nat. 2009. "Positive Spillover? Impact of the Songhua River Benzene Incident on China's Environmental Policy," Wilson Center, March, https://www.wilsoncenter.org/publication/positive-spillover-impact-the-songhua-river-benzene-incident-china-s-environmental. Accessed 23 October 2018; Davison, Nicola. 2013. "Rivers of blood: the dead pigs rotting in China's water supply," The Guardian, 30 March, https://www.theguardian.com/world/2013/mar/29/dead-pigs-china-water-supply. Accessed 23 October 2018; Kaiman, Jonathan. "Chinese struggle through 'airpocalypse' smog," The Guardian, 17 February, https://www.theguardian.com/world/2013/feb/16/chinese-struggle-through-airpocalypse-smog. Accessed 23 October 2018.

and China's growing greenhouse emissions.[63] Scholarly interest in China's environmental issues, though, precedes this new interest by several decades. Vaclav Smil, a Canadian geographer, was one of the first scholars to scrutinise the causes behind land degradation and pollution in pre-reform Maoist China.[64] Before then, much of the work resorted to, in Smil's words, 'gross overgeneralisations' and ideologically based arguments that were myopic and ignored the actual reality and causes of China's environmental woes.[65] Depending on the ideological disposition of the particular author, and their opinion of the socialist government in Beijing, China's environment was either great or disastrous. Their examinations reflected little rigorous intellectual nuance.[66]

This lack of nuance soon changed with the research of Vaclav Smil. Writing in *Asia Survey* in 1980, he detailed how China's development during the Maoist period caused significant environmental damage through misguided policies which resulted in soil erosion, water overuse, air and water pollution, deforestation and noise pollution.[67] He followed these articles up in 1984 with a more in-depth treatment in *The Bad Earth,* and then in 1993 with *China's Environmental Crisis*.[68] Smil's research stressed that Chinese Maoist leaders, through mainly ill-conceived strategies, caused a similar set of environmental problems to those facing Western developed nations. This approach provided a rebuttal to Chinese authorities' assertions that, in contrast to Western capitalist nations, their version of socialism was harmonious with nature.[69] One example that he focused on was the lauded Maoist strategy of boosting arable land availability through land reclamation. Smil noted that even though reclaiming *terra firma* from lakes and rivers did increase arable land by 3-4 per cent, these changes to the environment also resulted in fewer water resources, such as freshwater fish. In many cases, the nutritional value of the reclaimed land also fell below its previous level when

[63] Kaiman, Jonathan. "Chinese struggle through 'airpocalypse' smog," The Guardian, 17 February, https://www.theguardian.com/world/2013/feb/16/chinese-struggle-through-airpocalypse-smog. Accessed 23 October 2018; Rapier, Robert. 2018. "China Emits More Carbon Dioxide Than The U.S. and EU Combined," Forbes, 1 July, https://www.forbes.com/sites/rrapier/2018/07/01/china-emits-more-carbon-dioxide-than-the-u-s-and-eu-combined/#537a0221628c. Accessed 23 October 2018.
[64] Smil 1980a, 1980b; Wu 2009.
[65] Smil 1984: iv.
[66] Ibid; Smil 1980b: 14. See also Kapp 1975.
[67] Smil 1980a.
[68] Smil 1984, 1993.
[69] Ottley and Valaukas 1983, 85.

the rivers and lakes were in their original state, because the new farmland was ill-suited for agricultural use.[70]

Since this early research of Vaclav Smil, more researchers have also turned their attention towards understanding the key historical causes of China's environmental problems.[71] For instance, historian Mark Elvin argues that the economic development that occurred in Imperial China in the 1800s resulted in more significant environmental stress than those France and other Western European nations experienced during the same period. In China's case, this situation was made more acute because it was unable to export this environmental 'pressure' to external imperial holdings, unlike European nations.[72] Elvin used the literal retreat of elephants to the south of China as a metaphor for the expansion of economic activity coming at the expense of China's wilderness and environment.

Another significant observer was the US scholar Judith Shapiro. She followed up the early work of Vaclav Smil and others in her widely cited book *Mao's War Against Nature*.[73] Shapiro's book explored the underlying reasons why there was so much environmental havoc wrought during the Maoist period. One point that Shapiro stressed is the 'militarisation' of Chinese society under China's then 'paramount leader' Mao Zedong 毛泽东. She outlined how he inculcated a martial mindset promoting the mentality that 'man must conquer nature' (人定胜天) into many small or large development projects to such a significant extent it supplanted the longstanding Confucian principle of the 'harmony between man and nature' (天人合一).[74] Through her examination of such case studies as population growth, dam construction and land reclamation, she showed that the crux of China's man-made environmental damage in the Maoist era was due to four central causes: (1) *political oppression* whereby those who proffered heterodox ideas challenging embedded ideological notions often experienced persecution for these views; (2) *utopian urgency* where considered policy preparations were eschewed in favour of hastily implemented mass mobilisation campaigns; (3) *dogmatic uniformity* where ideas needed to conform with Maoist ideological principles; and (4) *state-ordered relocations*

[70] Smil 1980b, 17.
[71] See, for example, Elvin 2004; Shapiro, 2001.
[72] Elvin 2004, 470. See also Crosby 1986.
[73] Shapiro 2001.
[74] Ibid, 66.

which allowed the Chinese state to control Chinese society in a way that ignored previous historical, cultural and geographical connections.[75]

The confluence of these causes, Shapiro argued, provided Mao with the ability to undertake massive socialist campaigns in which, for example, large swathes of forests were destroyed by villagers during the Great Leap Forward (1958–1962) to fuel their sub-standard 'backyard steel furnaces'. Moreover, Shapiro showed that these four causes also allowed the Chinese state to carry out the ill-conceived construction of the Sanmenxia hydroelectric dam on the Yellow River against the technical advice of hydro-engineers. In the end, the dam's construction led to the relocation of millions of people and irreparable environmental damage to the water quality of the river. In terms of one of its original objectives, it produced less than the forecast electricity generation due to silt sedimentation within the hydroelectric turbines. The hydro-engineer Huang Wanli 黄万里 was purged by authorities for raising precisely this problem before its construction.[76] In Judith Shapiro's opinion, Mao Zedong and the Chinese state during this period were a fundamental factor in China's environmental damage. This led to her theoretical reformulation of Paul Ehrlich and John Holdren's iconic I=PAT formula, because it 'inadequately accounts for the role of the state, which may powerfully shape the elements on the right side of the equation and govern their interaction'.[77] This environmental history points to a complex and troubled relationship between socialist economic modernisation and environmental degradation in Maoist China.

The Impact of 'Reform and Opening Up' on China's Environment

More recently, scrutiny has centred on exploring the growing impact of social and economic activities on China's environment during the Reform period, which Deng Xiaoping and Chinese authorities initiated at the Third Plenum of the 11th Central Committee in 1978. This increased attention partly stems from Chinese researchers having access to more noteworthy information (such as interviews and official documents) than was available when Smil wrote his early research outside China.[78] First and foremost, however, this increased scrutiny resulted

[75] Ibid, 4.
[76] See Chapter Three in ibid.
[77] Ibid, 196. See also Ehrlich and Holdren 1971.
[78] He had to rely primarily on Chinese-language news reports because of travel restrictions, see Wu 2013, 105.

from an acknowledgement that environmental problems have increased in severity since 'reform and opening up' and since China transitioned away from its Maoist command economy to a 'socialist market economy' (社会主义市场经济) based on market principles. For instance, China's township village enterprises (TVEs, 乡镇企业) have helped absorb large surpluses of rural labour on the way to constituting around 42 per cent of industrial output in 1994.[79] However, as Smil notes, China's State Environmental Protection Bureau[80] (SEPB) 'can only guess at the total amount of untreated waste' that leaves these companies on a daily basis.[81] Moreover, much of this research reflects the point of view that China's market-led economic growth over close to four decades has, to refer to the I=PAT formula again, significantly increased its 'affluence' (increased consumption per capita within China – A) and 'technology' (the enhanced processes China now uses to obtain and transform resources into goods and services – T), while its 'population' (P) also has continued to grow in spite of the 'one-child policy'.[82] This can only mean that the resulting impact (I) on the environment has grown.

China's increased integration with the world economy since it acceded to the World Trade Organisation (WTO) in 2001 also has placed further pressure on its environment, as it has further entrenched the nation's role as the 'world's factory' (世界工厂).[83] The accession was a boon for China's economy. For instance, China's economy witnessed ten-fold increase in GDP during the 17 years following inclusion within the WTO.[84] China also experienced an upswing in the amount of merchandise exported as full advantage was taken of its more globally-integrated economy.[85] Yet, as indicated by the illustration of China's ecological footprint in Chapter One, that same upward economic trajectory affected China's overall environmental footprint.

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[79] Lin, Cai and Li 2003, 189.
[80] Chinese name is 国家环境保护局.
[81] Smil 1993, 125.
[82] See Greenhalgh and Winckler 2005. However, China's population is forecast to 'shrink' in the coming decades, see Myers, Stephen Lee and Claire Fu. 2019. "China's Looming Crisis: A Shrinking Population," New York Times, 21 January, https://www.nytimes.com/interactive/2019/01/17/world/asia/china-population-crisis.html.
[83] Zhang 2006; Bao, Chen and Song 2008.
[84] GDP data taken from World Bank. 2019. "World Bank Open Data," https://data.worldbank.org/. Accessed 22 July 2019.
[85] Naughton 2007, 389-391; Ianchovichina and Martin 2004.

Accession to the WTO was a mixed blessing, according to the US academic Abigail Jahiel. On the one hand, she conceded that China's WTO accession could have improved some aspects of China's environmental protection efforts through the adoption of international monitoring standards, such as ISO 14001 environmental management standards. However, on the other hand, she was more firmly of the view that China's further integration into the global economy would place further pressure on China's environment, and that the economic growth facilitated by WTO membership would soon overwhelm any environmental protection work undertaken by Chinese authorities. She argued that WTO accession would reinforce 'the normative premise of the WTO' to prioritise economic development.[86]

Earlier studies correspond with the underlying logic of Jahiel's argument. For instance, the International Institute of Sustainable Development (IISD) and the China Council for International Cooperation on Environment and Development (CCICED) in a joint 2004 report entitled *An Environmental Impact Assessment of China's WTO Accession,* argued that China's WTO accession had resulted in unfavourable environmental outcomes. In a survey of six economic sectors, they found that WTO membership resulted in significant 'economic effects' that would 'scale up' China's production through increased foreign trade.[87] This increased production would promote dirtier industries due to China's low-cost position within the world economy. While preventative pollution technologies could mitigate and lessen these adverse effects, the IISD and the CCICED concluded that China's WTO accession 'brought significant new challenges for environmental management in China'.[88] US academic Elizabeth Economy also made a similar point, highlighting that China's WTO membership facilitated the growth of highly polluting small-scale industries like the textile industry where environmental management is unable to quickly mitigate or reduce effluent and emissions.[89] This literature links China's recent rapid economic development and increased global economic integration with environmental degradation. Increasingly, researchers have begun focusing on its impact on different parts of China's biosphere.

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[86] Jahiel 2006, 325.
[87] The sectors were textile, energy, forestry, agriculture, automobiles and aquaculture, see CCICED and IISD 2004, 1.
[88] Ibid, 3.
[89] Economy 2010, 202-203.

China now suffers from significant and severe ecological degradation that crosses all areas of its biosphere. In recent years, research has confirmed that China's rapid modernisation has led to ambient air pollution within its cities. Many studies point out that China's cities have some of the deadliest air in the world.[90] China's water quality also has experienced severe declines to the point that close to half of its rivers are harmful or too toxic for human use.[91] Soil quality has fared little better. As noted in Chapter One, in 2014 the Ministry of Environmental Protection (MEP) released the details of a 2005 to 2013 soil pollution survey it conducted with the Ministry of Land Resources[92] after previously labelling the survey findings a 'state secret'. This report found that just over one-seventh of China's land was polluted, and just over one-fifth of farmland was polluted with toxic heavy metals such as mercury and cadmium.[93] Some Chinese experts viewed these results as 'conservative' and not reflecting the full extent of the problem.[94] For the most part, recent Western research has increasingly focused on China's expanding carbon footprint and its effect on anthropogenic climate change.[95] This attention reflects the significance of China's growing carbon dioxide emissions and the recognition by experts that China needs to be a crucial player in preventing the harmful consequences of climate change.[96]

Research also has noted a negative feedback loop between environmental degradation and some indicators of socio-economic development. Many studies have explored the health impacts of environmental pollution in China, with a recent World Health Organisation report calculating that over one million people died due to air pollution in China in 2015.[97] A '2010 Global Burden of Disease Study' published in the UK medical journal *Lancet* in 2012 placed

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[90] Lim et al. 2012; WHO. 2018. "One third of global air pollution deaths in Asia Pacific," 2 May, https://www.who.int/westernpacific/news/detail/02-05-2018-one-third-of-global-air-pollution-deaths-in-asia-pacific.html. Accessed December 21 2018.
[91] Turner 2007, 28; Economy 2010, 124-125.
[92] Chinese name is 国土资源部.
[93] Delang 2017, 12.
[94] Tan, Deborah. 2014. "Pollution: 5 Reasons to Remain Optimistic," China Water Risk, 13 May, http://www.chinawaterrisk.org/opinions/pollution-5-reasons-to-remain-optimistic/. Accessed 20 January 2018.
[95] See, for example, Lewis 2009; Morton 2011.
[96] Morton 2008; Moore 2011; Andrews-Speed 2012.
[97] WHO. 2018. "One third of global air pollution deaths in Asia Pacific," 2 May, https://www.who.int/westernpacific/news/detail/02-05-2018-one-third-of-global-air-pollution-deaths-in-asia-pacific.html. Accessed December 21 2018.

the number of 'premature deaths' in China at 1.2 million – more than any other nation.[98] The growing issue of 'cancer villages' (癌症村) in China is also a serious matter, with many villages throughout China encountering statistically significant higher rates of cancer due to the presence of polluting industries.[99] These studies reveal the interconnected relationship between environmental pollution and public health.

Turning to economic impacts, research has attempted to account for the adverse economic externalities surrounding China's modernisation.[100] In 2007 the World Bank jointly explored, along with the State Environmental Protection Administration, the 'costs of pollution' in China. Using a methodology that placed a monetary value on certain kinds of pollution and environmental degradation, the report estimated that the total environmental cost of pollution in China's water supply and groundwater depletion was 341.4 billion yuan in 2003, just under 3 per cent of its then GDP.[101] Nine years later, another World Bank report into global pollution found that outdoor and indoor pollution had cost the Chinese economy over 10 per cent of its GDP in 2013.[102]

Beyond these health and economic costs, China's environmental degradation and pollution also has raised concerns over notions of 'security', or to be more precise 'insecurity'. Soil degradation and loss of arable land due to urban expansion have frequently emerged as topics of debate within the context of China's environmental problems.[103] The concern for food security has been raised because, as McBeath and Huang-McBeath note, China has 22 per cent of the global population, but just 7 per cent of total land.[104] Although conjecture still exists about the extent of China's food insecurity due to methodological difficulties surrounding the

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[98] Lim et al. 2012
[99] Wang 2018, 868; Piovani 2017, 97.
[100] SEPA and World Bank 2007; Mao, Yushi, Hong Sheng, and Fuqiang Yang. 2008. "The True Cost of Coal," Greenpeace China, http://act.greenpeace.org.cn/coal/report/TCOC-Final-EN.pdf. Accessed 22 June 2013.
[101] SEPA and World Bank 2007. Percentage calculated from 2013 GDP (US$ 2018), see World Bank. 2019. "World Bank Open Data," https://data.worldbank.org/. Accessed 22 July 2019.
[102] World Bank and University of Washington's Institute for Health Metrics and Evaluation. 2016. "The Cost of Air Pollution: Strengthening the Economic Case for Action," World Bank, http://documents.worldbank.org/curated/en/781521473177013155/pdf/108141-REVISED-Cost-of PollutionWebCORRECTEDfile.pdf. Accessed 23 January 2018.
[103] Smil 1993, 185; Deng and Li 2016; Thomas 2013; Branigan, Tania. 2008. "Soil erosion threatens land of 100m Chinese, survey finds," The Guardian, 21 November, https://www.theguardian.com/world/2008/nov/21/china-soil-erosion-population. Accessed 25 January 2018.
[104] McBeath and Huang-McBeath 2010, 85.

calculation of arable land in China, studies have claimed that China has a significant problem with food security due to soil pollution associated with its rapid social and economic development.[105] These issues are exacerbated and amplified when taken in context with the MEP report referred to earlier estimating around 20 per cent of China's land was toxic.

Water security also presents another serious problem for China that interlinks with matters of agricultural production and public health. Council on Foreign Relations analyst Elizabeth Economy raised in testimony to a US congressional roundtable on China's environment that China's annual per capita water supply was 25 per cent below the global average. She noted that by 2030 its already scarce water resources were expected to decrease by a further 500 cubic metres (m^3) per capita from 2,200 m^3 to 1,700 m^3.[106] Moreover, Asian Development Bank, outlined in a 2012 report that 12 provinces and municipalities in China, or 32 per cent of the population, were classified as suffering from water scarcity (under 1000m^3 per capita). Regions suffer from an unequal distribution of water: Southern China has 1,100 m^3 per capita, while Northern China contains just 434 m^3 per capita.[107]

Another theme explored in the extensive literature on China's environment addresses the possibility that China's environmental pollution could result in civil unrest.[108] This is a growing issue in China, in which mounting environmental problems are playing a leading role. For instance, in 2004, Chinese authorities documented over 74,000 'mass incidents' of Chinese citizens protesting. In 2005, there were close to 51,000 protests linked to pollution, an increase of 30 per cent from the previous year.[109] Statistics such as these are frequently cited in the literature to demonstrate that China has experienced growing civil unrest due to its environmental pollution.[110] The chapter so far has revealed that, since the advent of the Reform period, there has been a growing acknowledgement amongst scholars that the relationship between the economy and the environment in China is complex and troubling. The question

[105] See Brown 1995; Smil 1999, 417; McBeath and McBeath 2010, 88-91; Chen 2007.
[106] Quoted in 2007. "2007 Report to Congress of the U.S.-China Economic and Security Review Commission of the One Hundredth Congress," U.S.-China Economic and Security Review Commission, November, https://www.uscc.gov/sites/default/files/annual_reports/2007-Report-to-Congress.pdf
[107] ADB 2016, 2-3.
[108] Deng and Yang 2013; Jing 2010; Gardner 2018, 137-164.
[109] Chan, Lee and Chan 2008, 298.
[110] See, for example, Jiang 2011, 121; Steinhardt and Wu 2016, 62.

that emerges from this literature is: how have Chinese authorities responded as their environment has deteriorated?

The Emergence of Environmental Institutions and Laws in China

Although the continuation of severe environmental pollution and degradation might suggest to the contrary, China's authorities have undertaken a variety of measures to protect the environment over the last four decades since the reform process began. Yet, as the above discussions suggest and the following scholarly debates will illustrate, their efficacy in protecting China's environment remains a disputed issue. However, one consensus within the academic literature is that recognition of the need for environmental protection emerged in the early 1970s when the Chinese government, as a newly recognised country, sent a United Nations delegation to the 1972 United Nations Conference on the Human Environment in Stockholm, at the urging of then Premier Zhou Enlai 周恩来.[111] Although Chinese authorities had organised a handful of sporadic and ad hoc environmental measures such as the 'three wastes' to tackle waste and public sanitation before this conference, nevertheless this United Nations conference marks the point when they experienced 'their birth of environ-mental consciousness'.[112] This conference laid the path for further environmental protection initiatives. Within a year of the Stockholm Conference, Party authorities convened their first National Conference on Environmental Protection, which led in 1974 to the creation of the first institutions tasked with environmental protection work, namely the Environmental Protection Leading Small Group (领导小组)[113] and its Environmental Protection Office[114], both situated underneath the State Council.[115]

Since the early 1970s, China watchers have noted how authorities have instituted a series of administrative reshuffles to strengthen institutions responsible for environmental protection. In

[111] Economy 2010, 93; Wu 2009, 388.
[112] Ottley and Valauskas 1983, 96-101. See also Edmonds 1999.
[113] Leading small groups are 'informal' supra-cabinet policy bodies made up of Party and government officials from relevant institutions. According to China expert Bonnie Glaser, they 'ensure the flow of information and forge consensus across various parts of the Chinese system. They also make policy recommendations that are forwarded to the PBSC [Politburo Standing Committee] for deliberation.' See Glaser 2013, 155. See also Miller 2008.
[114] Chinese name is 国务院环境保护领导小组办公室.
[115] Sanders 1999, 1206.

1982, the State Council relocated the Environmental Protection Office to the Ministry of Urban and Rural Construction and Environmental Protection[116], which some researchers argued was a regressive measure as it was not given the elevated status of a stand-alone institution.[117] However, that point marks the only time when the central government did not bureaucratically upgrade its lead institution for environmental protection. Six years later, in 1988, the Chinese government, in a broad set of administrative reforms, increased the status of China's lead environmental agency by moving the Urban and Rural Construction Environmental Protection Agency[118] back underneath the State Council and providing it with a higher 'bureau rank' (局级). Since then, as China's leading environmental bureaucratic organisation, it has experienced a continual strengthening of its bureaucratic status. Over a series of administrative and institutional reforms that have occurred in 10-year increments, the Chinese government has bolstered the bureaucratic importance of its environmental bureaucracy. In 1998, the State Council promoted the State Environmental Protection Agency to an 'administration' (总局级) bureaucratic rank, renaming it the State Environmental Protection Administration[119] (SEPA). Ten years later, the State Council created the Ministry of Environmental Protection, upgrading SEPA's bureaucratic status to that of a 'ministry' (部级), which gave it a minister position within China's cabinet.[120] The final stage of bureaucratic reform occurred in 2018 when the State Council renamed the MEP as the Ministry of Ecological Environment[121], allowing it to assume the joint-lead role on climate change with the National Development Reform Commission (NDRC).[122] This bureaucratic history reveals that, while China's economic miracle was being sustained, Chinese authorities were active in administratively strengthening their environmental institutions.

[116] Chinese name is 城乡建设环境保护部.
[117] Jahiel 1998, 768.
[118] Chinese name is 城乡建设环境保护部环境保护局.
[119] Chinese name is 国家环境保护总局.
[120] Jahiel 1998, 768.
[121] Chinese name is 生态环境部.
[122] Chinese name is 国家发展改革委员会. Ma, Tianjie and Qin Liu. 2018. "China reshapes ministries to better protect environment," China Dialogue, 14 March, https://www.chinadialogue.net/article/show/single/en/10502-China-reshapes-ministries-to-better-protect-environment. Accessed 29 January 2019. For China's former institutional framework for climate change see Chen 2012, 26.

Over the same period, a range of environmental laws and international treaties were legislated and ratified to control environmental pollution and define what constituted environmental protection. Scholars have noted how the first of these laws was passed in 1979 when China's National People's Congress[123] (NPC) passed the *Environmental Protection Law (Trial)* and *Forestry Law*.[124] These laws were crucial at the time because (as Ottley and Valauskas have noted) before 1979, laws were rarely used to change social behaviour, let alone regulate conduct that impacted negatively on the environment.[125] In 1987, the Chinese government ratified the 1987 *Montreal Protocol on Substances that Deplete the Ozone Layer*, joining global efforts to phase out chlorofluorocarbons.[126] Two years later, the NPC upgraded a trial environmental protection law to permanent status when they enacted the *Environmental Protection Law*.[127] Many other related laws have since been legislated by the NPC. Richard Ferris Jr. and Zhang Hongjun have listed 19 environmental laws passed between 1979 and 2005, tackling such issues as cleaner production, air pollution, water pollution, and solid waste.[128] Since 2005, the NPC has passed several new or revised laws to bolster environmental legislation in China, including a circular economy law (passed in 2007 and amended in 2018), an energy conservation law (passed in 1997 and amended in 2007, 2016 and 2018), a renewable energy law (passed in 2005 and amended in 2009), an environmental protection law (passed in 1989 and amended in 2014), a coal law (passed in 1996 and amended in 2016), a water pollution control law (passed in 1984 and amended in 1996, 2008 and 2017), an ocean environmental protection law (passed in 1982 and amended in 1999, 2013 and 2016), an air pollution control law (passed in 1987 and amended in 1995, 2000 and 2018), and an environmental protection taxation law (passed in 2016 and amended in 2018).[129] China's steadily growing collection of environmental-based legislation and legislative amendments

[123] Chinese name is 全国人民代表大会.
[124] Ottley and Valauskas, 1983; Smil 1993; Palmer 1998; Ross 1998.
[125] Chinese authorities instead attempted to solve environmental problems through Maoist mass participation campaigns or 'simple solutions' based on Maoist ideals, see Ottley and Valauskas, 1983, 82. See also Beyer 2006, 185.
[126] Zhao and Ortolano 2003.
[127] Zhao 2005.
[128] Ferris Jr. and Zhang 2005, 79.
[129] Qin and Meng 2017; Wu, Qing. 2019. "Environmental law and practice in China: overview," Thomson Reuters Practical Law, 1 April, https://uk.practicallaw.thomsonreuters.com/3-503-4201?transitionType=Default&contextData=(sc.Default)&firstPage=true&bhcp=1. Accessed June 23 2019.

demonstrates that, at least superficially, Chinese authorities are increasingly concerned with the environmental costs of China's modernisation.

Many environmental researchers believe that the combination of these environmental protection institutions and laws have created a modern environmental regulatory regime in China.[130] As noted below, while much of the research highlights 'deficiencies' in these environment agencies and legislation, there is also explicit or implicit recognition within the literature that China has created a notable environmental bureaucracy and regulatory regime that has achieved many successes.[131] In 1989, the year that the SEPB formally commenced overseeing national environmental planning as an independent bureau, the Chinese government devolved authority to local environmental protection bureaus (EPBs, 当地环保局) to enforce its new environmental protection law. Focusing on the development of China's environmental protection institutions and legislation, Ferris Jr. and Zhang deem China's environmental reform as a positive work-in-progress.[132] They state that despite its idiosyncrasies and faults, Chinese authorities have undertaken a 'significant amount of positive work…toward a more robust environmental protection regime in China.' In many cases, these new laws have strengthened the power of China's lead environmental agency to levy fines, seize polluting equipment, restrict or suspend production, and improve environmental information disclosure.[133] For instance, Jan Hamrin, a renewable energy policy expert, commented that the final draft of the 2005 *Renewable Energy Law* included penalty mechanisms which, if enforced, were suitable for their purpose. She noted that one section of the *Renewable Energy Law* stipulated that power grid companies which did not take electricity from renewable power operators and refused to rectify the situation 'will be fined an amount that may not exceed twice the economic loss incurred by the relevant enterprise'.[134] Moreover, in 2014, the MEP issued new rules that required over 15,000 plants (the top 65 per cent of polluting enterprises) to disclose 'hourly data on air and water pollution releases'.[135] Elizabeth Economy has criticised Chinese authorities' environmental protection efforts in the past, but she also has acknowledged that

[130] Ferris Jr. and Zhang 2005; Qin and Meng 2017.
[131] See Jahiel 1998, 2006; Ma and Ortolano 2000.
[132] Ferris Jr. and Zhang 2005, 67.
[133] Qin and Meng 2017, 21.
[134] Hamrin 2006, 429.
[135] Wang 2018, 881.

Chinese environmental protection authorities such as the then-SEPA have participated in significant enforcement campaigns that have resulted in the closure of polluting industries.[136]

US political scientist Bruce Gilley also has focused on the ability of Chinese authorities to achieve positive environmental outcomes within the more extensive debate of 'authoritarian environmentalism', which he describes as 'a non-participatory approach' to the formulation and implementation of environmental policies.[137] He argues that China's environmental institutions and governance system have significant drawbacks and hinder environmental protection. However, he argues that they do allow for 'a rapid, centralised response to severe environmental threats', which is a significant advantage when coordinating state and societal efforts to combat climate change.[138] Gilley's argument is a more nuanced version of that proposed by Thomas Friedman, who, in an often-cited article, highlighted the benefits of 'enlightened authoritarianism' in China for coordinating an effective climate change response.[139] Thus, just as political authoritarianism has been seen by commentators to be compatible with spectacular economic growth, the same authoritarianism has been seen to hold some advantages in pursuing environmental goals.[140]

Researchers have also documented the manner in which Chinese leaders have sought to make China's economy more environmentally sustainable.[141] Over the past two decades, Chinese authorities have 'promoted' 'cleaner production technology' within Chinese companies.[142] They have also sought to shift China's development towards 'circular economic' principles. These policies seek to move beyond simple end-of-pipe pollution treatment to reduce resource use and pollution during the production process.[143] Chinese leaders have also called for a 'resource-saving and environmentally-friendly society' and to undertake 'low-carbon' or 'green' development.[144] China's recent five-year plans have included such

[136] Economy 2010, 4.
[137] Gilley 2012, 287.
[138] Ibid, 300.
[139] Friedman, Thomas. 2009. "Our One-Party Democracy," New York Times, 8 September, https://www.nytimes.com/2009/09/09/opinion/09friedman.html. Accessed 18 January 2018.
[140] Lee 2006; Wade 1990.
[141] Lewis 2012; Qin and Meng 2017; Yuan, Bi and Moriguichi 2006.
[142] Hicks and Dietmar 2007; Mol and Liu 2005.
[143] Shi 2003; Yuan, Bi and Moriguichi 2006; Su et al. 2013.
[144] Jiang, Sun and Liu 2010; Hofem and Heilmann 2013.

ecological concepts to frame China's future economic development.[145] Recently, China watchers have noticed how China's most powerful politician, Xi Jinping, has expressed the wish for the creation of an 'ecological civilisation' in China with 'mountains of gold and silver' and 'clear waters and green mountains' – a reference to the twin objective of environmental protection and economic development.[146] These examples of policy initiatives and political rhetoric highlight how Chinese authorities view issues of sustainability through an economic lens.

This economic aspect of environmental reform is further illustrated by the involvement of economic sectors of China's bureaucracy in environmental policy initiatives. Up until the mid-1990s, the SEPB was the sole institution involved in environmental policy. However, Shi and Zhang argue that the contribution of economic agencies emerged in the decade leading up to the mid-2000s when China witnessed a 'greening of economic agencies', whereby an environmental awareness developed within the NDRC and, its predecessor, the State Economic and Trade Commission[147] (SETC). They argue that these institutions have contributed to formulating many of the aforementioned economic-centred policies that Chinese authorities have designed to protect the environment.[148]

The Chinese state has also permitted over the past few decades the development of an environmental civil society that acts as 'third force'[149] in China, providing expertise, or another unofficial monitor of local authorities. In many cases, environmental bureaucrats have welcomed the entrance of Chinese environmental NGOs.[150] Private environmental NGOs in China have established numerous wildlife campaigns related to such issues as anti-poaching and migratory route protection for Tibetan Antelope and wetland conservation for migratory birds.[151] Others have acted as legal advocates for pollution victims.[152] The environmental space in China also has experienced the entrance of governmental organised NGOs (known as

[145] Cao, Garbaccio and Ho 2009.
[146] Marinelli 2018; Schmitt 2018;
[147] Chinese name is 国家经济贸易委员会.
[148] Shi and Zhang 2006, 281.
[149] Yang 2005, 54.
[150] Ibid; Ho 2001, 910.
[151] Ho 2001; Morton, 2005.
[152] Wang 2007, 204-205.

'GONGOs') that have allowed central environmental protection authorities such as SEPA and the MEP to devolve responsibility for specific environmental protection tasks, such as raising awareness for certain environmental issues or training personnel for environmental protection activities in a manner that conforms with their environmental policy objectives.[153] Academic Fengshi Wu also has noted that environmental GONGOs enjoy funding and personnel with former high-level politicians, government officials or 'techno-politicians' that allow them to achieve environmentally-related goals such as training of government officials.[154] However, her research shows that these GONGOs are becoming increasingly independent by establishing links with organisations outside of the government.[155] Overall the literature notes that China's civil society has led to positive environmental outcomes. Studies have been conducted that show that environmental NGOs are fostering a 'green public culture' in China that has led to increased environmental awareness.[156]

However, there still exists much scepticism concerning the ultimate efficacy of environmental NGOs and whether these organisations can act in a similar way to Western environmental NGOs that challenged the state from the 1960s onwards. An important point often raised in the literature concerning environmental issues, civil society and NGOs is that Chinese civil society is different than Western nations because 'associational life in China remains deeply embedded within the state'.[157] One potential impediment identified is that the political restrictions placed on environmental NGOs by Chinese authorities. For instance, like all NGOs, they must register with the Ministry of Civil Affairs[158] and meet precise guidelines if they want to operate as a 'social organisation' (社会团体). The Ministry of Civil Affairs and sponsoring units can refuse applications for NGO status with no right of appeal for the applicant.[159] These guidelines mean that, as Schwartz elaborates, NGOs 'without legal status and a sponsor… will encounter difficulties accessing funding, obtaining legal protection and interacting with government'.[160] These guidelines also signify that Chinese environmental

[153] Wu 2003, 36; Schwartz 2004.
[154] Wu 2003, 41-42.
[155] Ibid.
[156] Yang and Calhoun 2007; Sima 2011.
[157] Morton 2005, 519.
[158] Chinese name is 民政部.
[159] Ho 2001, 903.
[160] Schwartz 2004, 37.

NGOs will shy away from challenging the government on anything that possibly calls into question the CCP's political legitimacy.[161] Recent research shows no sign that authorities will relax their control on environmental NGOs.[162] The overarching theme of the literature concerning Chinese environmental NGOs is that they must remain non-political if they wish to function within China's political system.[163] From this description, it is clear that researchers are divided on the extent to which China's civil society can perform the same role that they are claimed to have performed in the West. However, the fact that they have materialised at all in a Marxist-Leninist state suggests that Chinese authorities take environmental problems seriously.

The Chinese government also has become increasingly involved with international stakeholders to achieve better environmental outcomes. An implicit and explicit recognition of some research is that Chinese institutional stakeholders have become more integrated into the global epistemic environmental community.[164] They are quite content to utilise the expertise of international experts, whether they are from foreign governments, multilateral organisations, or NGOs if their expertise provides the technical or institutional answers to cope with and solve China's environmental problems. Chinese government departments have also drawn from the financial assistance from foreign governments to drive environmental policy initiatives. For instance, Jost Wübbeke (as well as Andreas Hofem and Sebastian Heilmann) explored the role that the UK Government (through its Foreign Office) played in promoting the concept of 'low-carbon economy' in China, through providing financial assistance and policy expertise to the Chinese Academy of Social Sciences (CASS).[165] Over the years, China also has become more productively involved in international fora and environmental regimes. Elizabeth Economy noted that back in 1972, the Chinese delegation to the United Nations Conference on Human Environment fell back on 'cold war rhetoric'.[166] Yet studies have noticed the constructive role

[161] Ho 2001, 916.
[162] Kostka and Zhang 2018.
[163] Ibid; Wu 2003; Morton 2005.
[164] Martinot 2001; Morton 2005.
[165] Hofem and Heilmann 2013; Wübbeke 2013. Chinese name for Chinese Academy of Social Sciences is 中国社会科学院.
[166] Economy 2010, 93.

that Chinese bureaucrats have performed in international environmental regimes ranging from the Montreal Protocol to more recent global climate change mitigation.[167]

What this literature suggests is that the Chinese government has taken the environmental implications of China's development seriously. Moreover, environmental awareness has spread to economic agencies as well as the highest political office in China. Despite China having an economy that remains predominantly reliant on coal, in recent years the Chinese government has fostered growth in their non-hydro renewable energy industry, with exponential growth in installed capacity.[168] As to the energy industry, it has closed down coal-fired power plants and pledged ambitious targets to the international community to limit coal consumption and carbon emissions by 2030.[169] Moreover, China has begun to slowly arrest its carbon emissions and industrial pollution (air and water) if viewed in per unit of GDP and per capita terms.[170] These examples suggest that the recent policy efforts of Chinese authorities are making a real difference to the impact of industry on the environment.

Yet, despite these positive institutional and legislative assessments, there remains much pessimism and criticism among China scholars regarding the overall effectiveness of China's environmental protection institutions and policies. Usually, the guiding empirical question for many of the critical treatments of China's environmental reforms is, to paraphrase Xiaoying Ma and Leonard Ortolano[171], *why does China still have environmental degradation despite a modern and extensive environmental protection administrative and regulatory regime*? Richard Sanders argues that China's economic ethos during this early industrialisation, characterised by Deng Xiaoping's apocryphal maxim 'to get rich is glorious' (致富光荣), meant 'that environmental legislation and the structures and institutions it established to reduce levels of environmental pollution and degradation had little chance to make headway'.[172] Such a dictum, others have noted, typically means that legislation to promote increased sustainability, such as cleaner production and circular economic practices, in China's economy, are based

[167] Zhao and Ortolano 2003; Hilton and Kerr 2017.
[168] Lewis 2012; Zhang, Andrews-Speed and Ji 2014.
[169] Li 2016, 50.
[170] Guan et al. 2018, 551; Zhang et al. 2019, 9.
[171] Ma and Ortolano 2000.
[172] Sanders 1999, 1209. See also Harris 2004.

more on 'encouragement' and 'promotion' rather than hard policy sticks.[173] Moreover, even though China participated positively in the 2016 Paris Agreement concerning climate change mitigation, there is still the perception in academia and the media that China ultimately prioritises its economy over the health of the planet.[174] These critics suggest that Chinese authorities ground their political achievements ultimately in matters of economic development, rather than environmental protection.

Others have centred their attention on the efficacy of China's leading central environmental institution, the MEP. There is a recognition that China's environmental protection agency has increased the MEP's bureaucratic rank, and thus its authority, within China's political system. Yet the MEP still cannot effectively control smaller subordinate work units outside of Beijing. For example, some scholars, such as Elizabeth Economy, Kenneth Lieberthal, Abigail Jahiel, and Ran Ran state that China's ongoing environmental degradation has been partly the result of low environmental enforcement by local EPBs. This weak enforcement resulted from 'fragmented authority' between central environmental protection authorities and local EPBs.[175]

Since the late 1980s, through the work of Kenneth Lieberthal and Mikel Oksenberg, a consensus has emerged within the literature is that while China remains a Marxist-Leninist one-party State, it suffers from 'fragmented authoritarianism'.[176] In short, fragmented authoritarianism can result from what Lieberthal terms the '"line-lump relationship" (条块关系) matrix muddle' whereby *tiao* (条), or vertical lines of authority (from vertically-integrated bureaucracies), intersect with *kuai* (块), or horizontal lines of authority (from geographic units such as provinces). Kenneth Lieberthal argues this 'fragmentation of authority in the Chinese political-administrative hierarchy makes it relatively easy for one actor to frustrate the adoption or successful implementation of important policies, especially since units (and officials) of the same bureaucratic rank cannot issue binding orders to each other'.[177] Therefore, in the case of China's local EPBs, researchers have noted how their responsibility for enforcement of China's

[173] Shi 2003; Feng and Yan 2007, 99-101.
[174] Hilton and Kerr 2017; McGrath, Matt. 2018. "China coal power building boom sparks climate warning." BBC, 26 September, https://www.bbc.com/news/science-environment-45640706. Accessed January 23 2019.
[175] Lieberthal 1997; Jahiel 1998; Economy 2005; Ran 2017.
[176] Lieberthal and Oksenberg 1988.
[177] Lieberthal 2004, 188

laws conflicts with their relationship with local governments who pay their salaries and provide them with office space and parking, among other things.[178]

In some cases, state funds are insufficient to meet the needs of environmental enforcement. Jahiel has reported that some local officials engage in the practice of 'eating discharge fees' (吃排污费), which sees pollutant discharge and other environmental fees used to supplement government funds. This dearth of resources for local EPBs can also result in bargaining between local EPBs and enterprises to arrive at a mutually agreeable fine arrangement that is more in line with profits and budgetary resources than environmental protection.[179] Also, low environmental legislative enforcement is compounded by the fact that some of China's environmental laws lack adequate penalty mechanisms to force industries to comply with environmental protection measures. Elizabeth Economy notes that the reason legislation has set environmental violation penalties at low levels is to increase compliance. However, in many cases, the polluting businesses roll any potential fines into operating costs, as pollution prevention technology is more expensive than running 'business as usual'.[180] Moreover, other researchers have noted instances of local EPBs fining local polluters only to have that fine balanced out by local or provincial government tax breaks. This literature places China's environmental problems within the context of environmental maladministration due to the peculiarities of China's governance system. Here the 'fragmented' nature of China's decentralised environmental governance is seen as reducing, rather than improving, 'environmental performance'.[181]

Beyond issues of fragmentation, other research notes how China's political system can stymie government openness and transparency. As China law expert Alex Wang notes, 'institutional actors are ever vigilant for any indication that disclosure may pose a threat to social stability. Where perceived risks emerge, environmental bureaus retreat, security institutions enter the fray, and the balance of efforts shifts decisively toward social control'.[182] Therefore, despite positive legislative efforts that have allowed for greater information

[178] Economy 2005, 109.
[179] Jahiel 1998, 775.
[180] Economy 2005, 110.
[181] Ran 2017.
[182] Wang 2018, 872.

disclosure, Chinese authorities can promote political and security concerns over environmental interests.

Chapter Two up to this point has described how the Chinese government has perceived and acted upon environmental protection over the past four decades. It also has canvassed the many impediments and contradictions that the Chinese government must overcome before the country can effectively tackle its environmental problems. Over the years, the Chinese government has steadily built a suite of institutions, laws and policies to regulate and reduce pollution and environmental damage caused by China's industry and its citizens. Its lead environmental protection organisation, the Ministry of Ecological Environment, is a member of China's state cabinet. As to civil society involvement, Chinese authorities have permitted the proliferation of environmental NGOs to assist unofficially as an environmental protection watchdog or practitioner. The literature also acknowledges that China's international integration has brought about positive environmental protection outcomes. China participates in a raft of international regimes and fora to tackle environmental problems, and it has benefited to a degree from foreign aid and investment to combat environmental issues as well as draw from external policy expertise. China today is starkly different from the China of four decades ago because of these environmental reforms. However, there are researchers who question the efficacy of these actions. Another question that emerges from all these documented shifts is whether China is presently experiencing unique environmental reforms based on their peculiar set of political, economic and cultural circumstances? Or, alternatively, are these environmental governance reforms reflective of a broader change that has already occurred in the Western developed nations and transcends national boundaries?

China and the Ecological Modernisation Debate

These questions concerning ecological restructuring and environmental reform in China drew the attention of an optimistic group of environmental sociologists labelled 'ecological modernisation theorists'. Their interest in China formed part of a broader interest in developing nations and environmental reform that occurred from the early 2000s onwards.[183] The critical question that motivated their research was whether environmental shifts within these developing countries formed part of a universal ecological transformation that some modern nations at a more advanced stage had already experienced known as 'ecological

[183] Mol and Sonnenfeld 2000; Mol and van Buuren 2003.

modernisation'. Ecological modernisation theorists were aware that China's environmental problems were in some instances quite severe and they remained cognisant of the many environmental reform obstacles Chinese authorities had yet to surmount. Nonetheless, the optimistic underpinnings to their environmental outlook meant they focused on the positive developments outlined in the previous section of this chapter to analyse whether such developments indicated that China was undergoing a similar trend as had occurred in countries such as West Germany and the Netherlands in the 1980s. The ecological modernisation theorists associated this earlier European trend with rising environmental consciousness. As a later section will detail, they concluded that China's environmental state and society had been transformed in a manner similar to Western Europe and the United States, albeit with some unique and contextual differences.

The chief proponent of ecological modernisation theory (EMT) is the Dutch academic Arthur Mol. He is also the pioneer for this theoretical pivot to China, having written or co-written multiple articles and book chapters that applied EMT to China.[184] Mol also co-edited a special issue of *Environmental Politics* 'Environmental Governance in China' in 2006 featuring some of the scholars already cited earlier in this chapter: Elizabeth Economy, Abigail Jahiel, and Han Shi. That issue and its collaborators demonstrate symbolically and practically how earlier empirical research informed Mol's work, as well as how he sought to embed himself within the earlier empirical work of these researchers. However, before the literature that applies EMT to China is reviewed, it is useful to provide an overall context and explanation of EMT.

Ecological Modernisation Theory

EMT provides a hopeful framework for the prospects of environmental reform and environmental sustainability. Its original adherents, primarily from Germany and the Netherlands, believed that post-industrial nations could undergo a process of 'ecological modernisation' and move to a stage where economic growth would not negatively impact on the environment.[185] Two German political scientists, Joseph Huber and Martin Jänicke, are

[184] See, for example, Mol 2006, Mol 2010a; Carter and Mol 2006; Zhang, Mol and Sonnenfeld 2007.
[185] Seippel 2000.

credited as the progenitors of EMT in the early 1980s.[186] Their work, Mol argued, evolved as a theoretical response to more radical de-modernisation or neo-Marxist theoretical perspectives which either rejected the 'modernisation project' or criticised the inherently destructive 'treadmill' logic of capitalism.[187] Proponents of EMT believed that evidence from Western Europe demonstrated that there were alternatives to deindustrialisation and reverting to lifestyles extolling 'small is beautiful'.[188] They also disagreed with neo-Marxist theories that capitalism and its insatiable need to extract value out of the environment would subvert any meaningful environmental reforms.[189]

EMT thereby provided an optimistic appraisal of the political and economic systems that had overseen the deleterious ecological consequences of post-World War II economic development. It rejected the argument that science and technology were inherently facilitators and accelerators of environmental degradation and pollution. The institutions that produced scientific and industrial innovations could instead transform and create technology that made modern societies more environmentally sustainable. Affluent societies could grow and still retain capitalistic structures while simultaneously reducing their environmental impact. Germany and the Netherlands provided the empirical evidence for this argument. EMT's sanguine view of modernity, many observers note, helped it gain supporters because its core economic message of 'business as usual' with less environmental damage was a more politically palatable concept than what the neo-Marxists offered.[190]

In the beginning, 'ecological modernisation' was a simple concept that highlighted 'institutional restructuring' in Western Europe within the 'techno-sphere'.[191] However, Arthur Mol, with the help of Gert Spaargaren, elevated the concept into a fully-fledged sociological theory.[192] As noted in Chapter One, these efforts led Mol to define the 'basic premise' of EMT as 'the centripetal movement of ecological interests, ideas and considerations involved in social practices and institutional developments, which results in the constant environmental

[186] Mol 2000.
[187] Ibid.
[188] Schumacher 1973.
[189] Schnaiberg 1980. See also York and Rosa 2003; York, Rosa and Dietz 2003.
[190] Buttel 2000
[191] Mol 2006, 20.
[192] Mol and Spaargaren 1993; Mol 1996; Mol 2010b.

restructuring of modern societies'.[193] This restructuring of society along ecological lines also led to the 'growing autonomy, independence or "differentiation" of an environmental perspective and environmental rationality vis-a-vis other perspectives and rationalities'.[194] This ecological modernisation process would eventually lead to a decoupling of economic growth from environmental damage. With that context outlined, the next question involves exploring the concepts that Mol and other ecological modernisation theorists employed to interpret the environmental changes taking place.

Mol separated this process of ecological modernisation into five 'themes' or indicators that have remained a core part of the theory since the mid-1990s.[195] The first of these themes relates to the twin core aspects of modernity: science and technology. These two modern 'institutions' could help societies ecologically reform by assisting the development of 'preventive socio-technological approaches [that incorporate] environmental considerations from the design stage of technological and organisational innovations'.[196] This focus on preventative technological measures is a core aspect of EMT because they are considered superior to 'traditional curative and repair options' applied under the outdated notion that 'pollute now, clean up later' or 'end-of-pipe' approaches could ameliorate environmental harm.[197]

In the second of the themes, EMT places importance on 'economic and market dynamics, institutions and agents' as important actors in environmental reforms. For instance, Mol argued that insurance companies or credit institutions could become 'social carriers of ecological restructuring, innovation and reform' based on market logic as well as concern for the environment. This point has opened ecological modernisation theorists to accusations of 'neo-liberalism'.[198] However, Mols defends his position by arguing that this accusation reflects criticism of the 'very optimistic, perhaps naive, attitude toward market actors and market dynamics in environmental reforms' that reflected the first contribution to ecological modernisation.[199] As he and his colleagues perceive it, EMT provides a 'broader framework'

[193] Mol 2001, 59.
[194] Mol 2006, 33.
[195] Mol 1996, 311-315; Mol 2010.
[196] Mol and Sonnenfeld 2000, 6.
[197] Ibid.
[198] Mol 2010b, 68; York, Rosa and Dietz 2003, 273.
[199] Mol 2001, 57.

to understand the 'relationships between private firms, states, and civil society actors and organisations' and moves 'beyond the narrow neo-liberal frameworks for understanding the role of privatisation, marketisation and liberalisation in environmental politics'.[200] They also acknowledge the arguments that ecological modernisation is an 'ill-fit' with US environmental reform, partly because of that nation's 'dominance of neo-liberalism'.[201]

The third EMT theme involves changes in the characteristics of the 'environmental state'. In societies experiencing ecological modernisation such as Germany, environmental governance has devolved from central authorities to cater for more 'decentralised, flexible and consensual styles', which replaced or complemented conventional top-down mechanisms of environmental governance.[202] Civil societal actors, such as NGOs, emerge to assist with new styles of environmental governance. This focus positions ecological modernisation in similar terrain as 'new social movement' theorists.[203]

Civil society also informs the fourth theme. Nations experiencing ecological modernisation witness a shift in the 'position, role, and ideology of social movements'.[204] These social movements, rather than stationing themselves on the political periphery, like radical green organisations during the 1970s, instead become involved in mainstream politics, such as green parties. These green parties also exhibit an ideology that is distinct from pre-existing ideologies such as socialism and conservatism.[205]

The fifth of Mol's EMT themes involves linking what could be termed the 'realist' (Mol, Spaargaren and Sonnenfeld) and 'constructivist' reading of ecological modernisation (the latter of which will be detailed in further depth later in this chapter). Mol states that societies experiencing ecological modernisation witness a growing 'parity' between 'ecological (or environmental) rationality' and 'economic rationality'.[206] In societies experiencing ecological modernisation, the 'complete neglect of the environment and the fundamental counter

[200] Mol, Spaargaren and Sonnenfeld 2014, 20.
[201] Ibid, 21.
[202] Mol 2010b, 68.
[203] Touraine 1985.
[204] Mol and Sonnenfeld 2000, 7.
[205] Inglehart 1990.
[206] Mol 2010b, 67.

positioning of economic and environmental interests are no longer accepted as legitimate positions'.[207] Mol often cites the discourse theorist Marteen Hajer and the political scientist Albert Weale as two sources for this fifth theme.[208] Their research into Dutch and German environmental reform concluded that ecological modernisation was a constructed 'discourse' or 'belief system'.[209] While Mol has incorporated such ideas into his EMT framework, he has eschewed adopting in full their constructive position. Mol's work aims to highlight that EMT is an observable *process* that later-staged modern nations experience, rather than merely an ideology that societies have adopted to guide their environmental reform.[210] It is these theoretical indicators that ecological modernisation theorists have used to draw out general patterns of China's ecological restructuring.

However, EMT has generated significant controversy and attracted numerous critics throughout its relatively short history. Some of this criticism has centred on the 'broad' or 'vague' nature of EMT. Despite the work of Mol and others, some critics argue that ecological modernisation theorists have yet to unify it into a single coherent theory which, for some, makes 'empirical research problematic and much of the [EMT] debate confusing'.[211] The environmental sociologist Fred Buttel believes that for EMT to advance as a theory it needs to integrate itself more into macro-sociological theory, with which it shares 'very close affinities…[such as] embedded autonomy, civil society, and state-society synergy theories'. He argues that it cannot operate solely on its own theoretically, despite the valiant efforts of ecological modernisation theorists led by Mol.[212] Others have criticised its 'myopic' focus on the causes of environmental problems. For instance, Michael Carolan has taken issue with its emphasis on production at the expense of incorporating consumption factors within the EMT framework.[213] This is a point that Mol and Spaargaren have acknowledged, but they insist that this criticism is more focused on the first wave of EMT literature characterised by Huber and Jänicke rather than their later iterations.[214] Lastly, due to its intellectual origins, EMT has also

[207] Mol and Sonnenfeld 2000, 7.
[208] See, for example, Mol and Sonnenfeld 2000, 7; Mol 2001, 111.
[209] Weale 1992; Hajer 1995.
[210] Mol 1996, 2010b.
[211] Milanez and Bührs 2007, 565-566.
[212] Buttel 2000, 57.
[213] Carolan 2004a, 2004b.
[214] Mol and Spaargaren 2004.

been accused of being a Eurocentric theory that does not reflect the environmental situation outside Western Europe.[215]

However, the most strident criticism of EMT has originated from the more radical environmental sociology perspectives raised earlier that ecological modernisation theorists sought to confront.[216] York, Rosa and Dietz have rejected many of the underlying assumptions that ecological modernisation theorists, specifically Arthur Mol, David Sonnenfeld and Gert Spaargaren, have made regarding EMT. In their view, Mol and other ecological modernisation theorists have yet to provide adequate empirical justification to support their 'normative' claim that 'the only possible way out of the ecological crisis is by going further into the process of modernisation'.[217] They also take issue with the 'death penalty fallacy' aspect of EMT. Specifically, they believe EMT conflates two separate arguments: '(a) simply, that the institutions of late modernity change in response to environmental challenges, or whether it is (b) the stronger argument that institutional changes in late modernity help resolve environmental problems and lead to sustainability'.[218] For them, ecological modernisation theorists have yet to make a convincing case for the second argument, because EMT has yet to demonstrate that 'modernisation does lead to reductions in energy and resource consumption'.[219] Quantitative studies such as their STIRPAT[220] (Stochastic Impacts by Regression on Population, Affluence and Technology) framework suggests the opposite in some cases.[221] Moreover, they stress that EMT needs to consider the 'Netherlands fallacy', i.e. that many modern nations export their resource use and environmental impact to other (often less developed) countries.[222] Overall this literature acknowledges that EMT focuses on 'relative' improvements in environmental governance and reform, but it is this aspect that leads

[215] Christoff 1996, 486; Buttel 2000, 64.
[216] See, for example, York and Rosa 2003.
[217] York and Rosa 2003, 274; York, Rosa and Dietz 2010.
[218] York and Rosa 2003, 275.
[219] Ibid, 281.
[220] *ST*ochastic *I*mpacts by *R*egression on *P*opulation, *A*ffluence, and *T*echnology is a statistical tool to analyse the extent to which population, affluence and technology impact the environment (rather than I=PAT which is a simpler environmental accounting tool), see York, Rosa and Dietz 2003.
[221] York and Rosa 2003.
[222] Ibid, 278-281.

them to believe that EMT should scale back many of its claims regarding the importance of modernisation in overcoming environmental degradation.

Mol and Spaargaren have responded to York et al.'s critique that they need to be more cautious with their empirical evidence by stating that 'the relation between theory and empirical evidence cannot be done away with via a naïve positivist "verify or falsify" claim: the black swan is never the falsification'.[223] However, York et al. retort that 'the contested issue is not about whether there are metaphorical black swans at all but rather about the relative frequency of black and white swans'.[224] In other words, the issue is about the 'general pattern of environmental consequences stemming from modernisation'. Despite its critics, EMT remains a highly influential theory within the discipline of environmental sociology, especially from the *Molian* perspective.[225]

Mol, Ecological Modernisation and China

To return to the discussion that started this section, the *Molian* version of EMT has been applied to the question of whether ecological modernisation underpins China's environmental reform.[226] While Mol is the principal author in this field, other researchers have utilised ecological modernisation as a theoretical framework to explore China's changing attitudes, both politically and societally, towards tackling environmental problems.[227] Also, many Chinese academics have utilised EMT as a theoretical lens to help understand Chinese environmental reform, and some of them have collaborated with Western environmental sociologists.[228] Moreover, in 2007, a research branch within the Chinese Academy of Sciences[229] devoted their annual modernisation report to ecological modernisation.[230] However, Mol and his colleagues remark that their theoretical interpretation was more in line

[223] Mol and Spaargaren 2005, 94.
[224] York, Rosa, and Dietz 2010, 81.
[225] Zhu et al. 2011; Hong, Xiao and Lockie 2012.
[226] Zhang, Mol and Sonnenfeld 2007; Mol 2006, 2010a; Carter and Mol 2006.
[227] See, for example, Zhu et al. 2011; Hong, Xiao and Lockie 2012; Yee, Lo and Tang 2013
[228] Hong Dayong 2013; Hong, Xiao and Lockie 2012; Li Huiming 2013.
[229] Chinese name is 中国科学院. Research branch of the Chinese Academy of Sciences was the Modernisation Research Centre 现代化研究中心.
[230] Zhongguo xiandaihua zhanlüe yanjiu keti zu, Zhongguo kexue yuan zhongguo xiandaihua yanjiu zhongxin 2007.

with the first generation of EMT, i.e., the report was more concerned with issues of production, technology and institutional change rather than consumption and globalisation factors.[231]

Mol and his colleagues argue that China has yet to reach a similar ecological modernisation path or stage as that experienced in Western Europe, and that there are many differences based on particular social and political contexts within China. However, they argue that these differences do not suggest that ecological modernisation has yet to commence; merely that it is at an earlier stage. They do concede though that there are particular aspects of Chinese politics and society that jar with the tenets of EMT. One such point they recognise is the role of civil society organisations in Chinese environmental reform (see earlier section). While Mol and others note that China's civil society has played a more prominent role more recently in China, they accept its lack of influence when compared to its Western counterparts.

The nature of the political regime in China also warrants consideration. On the one hand, ecological modernisation theorists accept that 'flexible and consensual styles of governance' have yet to be embedded within Chinese society, because the CCP still retains significant political control and the ability to quash environmental movements or debates if they deem them threats to their political legitimacy. In this case, China's environmental governance seems more akin to what Bruce Gilley later termed 'environmental authoritarianism'.[232] On the other hand, Mol highlights that some environmental transformations in China are explained by EMT. China has undertaken decentralised environmental protection work through the formation of local EPBs (even if he acknowledges that these local EPBs can sometimes achieve uncertain environmental outcomes). Furthermore, he points to the fact that government-organised NGOs (referred to earlier as 'GONGOs') are starting to develop greater autonomy from the state, even if they are relatively ineffective compared to Western NGOs.[233] Mol also maintains that the influence of market dynamics is becoming a more decisive factor on environmental processes in China's companies, by highlighting the example of PetroChina's joint-venture operations with Western oil multinationals. PetroChina, he states, is 'acutely aware of the need to acquire internationally-recognized environmental management knowledge, and to meet standards and emission levels, allowing it to compete on a global market'.[234] It is these and other aspects that

[231] Zhang, Mol and Sonnenfeld 2007, 665.
[232] Gilley 2012.
[233] Mol 2006, 47.
[234] Ibid, 46.

give Mol and his colleagues the confidence to use the term ecological modernisation in the context of China.

In particular, Mol claims that 'most environmental reform initiatives are firmly based on, make use of and take place within the context of China's modernization process. In that sense, it seems justified to use the term "ecological modernization" to describe China's attempts at restructuring its economy along ecological lines'.[235] Moreover, Carter and Mol have noted that 'if OECD [Organisation for Economic Cooperation and Development] innovations in environmental governance can be captured by the concept of ecological modernisation, then China's environmental reforms can be labelled as a variant, or different style, of ecological modernisation'.[236] Other writers have supported these claims. In a study applying EMT to China, Hong et al. concur with Mol, pointing out that the 'the case of China can be linked to ecological modernization theory as developed within Western environmental sociology and there is much to be learned in China from the experience of environmental reform elsewhere'.[237]

However, critics are less optimistic about the appropriateness of labelling the Chinese experience as ecological modernisation. Victor Li and Graeme Lang suggest an ongoing 'tension between ecological modernisation and the imperatives of the treadmill of production'.[238] Moreover, Chinese environmental sociologist Huan Qingzhi 郇庆治, a neo-Marxist from Peking University, argues that ecological modernisation

> mainly generalised from the experiences of the developed countries, is an appropriate phrase or theory to frame where China is moving ahead or should be headed. My major objection is that, even if ecological modernisation in its minimum standard is realisable, there is no guarantee that it will lead China to a sustainable future. For China, ecological modernisation might be the only realistic road, but it is definitely not the green one.[239]

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[235] Ibid, 51-52
[236] Carter and Mol 2006, 333.
[237] Hong, Xiao and Lockie 2014.
[238] In the early 2000s, under the leadership of the State Environmental Protection Administration and National Bureau of Statistics, the Chinese government considered implementing a green accounting evaluation scheme for government cadres called 'Green GDP' (绿色 GDP) or 'Green National Accounting' (绿色国民经济核算). This policy mechanism would have evaluated local government and party cadres not just on their ability to make economic development, but also their ability to reduce the negative environmental externalities of that development, see Li and Lang 2009, 57.
[239] Huan 2007, 686-687.

These statements show that the EMT literature on China's environmental reforms has reached something of an impasse. One the one hand, ecological modernisation theorists believe that there are enough noticeable environmental changes in China to warrant the link with ecological modernisation. Moreover, these theorists can draw on ongoing empirical evidence to further illustrate their case.[240] However, others believe that China has yet to reach a watershed moment whereby it steps off 'the treadmill of production', even if Chinese society and industry have experienced relative environmental improvements. Scholars such as Huan Qingzhi also believe that the normative basis of ecological modernisation in German and Dutch reforms and ecological restructuring do not provide much confidence in a Chinese context.

Therefore, beyond measuring relative improvements, the question remains: can the concept of ecological modernisation shed any further light on environmental reforms in China? One approach is to ask the following, more constructivist, question that Huan Qingzhi hints at when he states that 'ecological modernisation might be the only realistic road' for China: could ecological modernisation help explain what motivates Chinese officials to undertake certain types of environmental reforms?

A Discursive Reading of 'Ecological Modernisation'

The constructivist interpretation of ecological modernisation has the potential to answer the question raised at the end of the previous section. The discussion above noted that beyond a theory of societal and institutional change, some scholars have employed ecological modernisation as a concept to characterise a normative political and societal 'discourse', 'ideology' or 'belief system' which originated within Western Europe during the 1970s.[241] This political ideology incorporated ecological reasoning as well as economic reasoning. From this perspective, ecological modernisation ceases to be a theory, because rather than view ecological modernisation as a late-modernity environmental transformation that can be observed, measured and verified, these constructivists instead consider ecological modernisation as a concept born out of a particular set of socio-historical and political circumstances pertinent to Europe and the United States. Therefore, the question for these

[240] See earlier sections on China's environmental reforms in this chapter.
[241] See, for example, Weale 1992; Hajer 1995; Christoff 1996; Dryzek 2013.

theorists changes from what 'produces' ecological modernisation to what 'constitutes' (and who constructs) ecological modernisation.[242]

After examining German environmental reform in the 1980s, Albert Weale concludes that the concept of ecological modernisation emerged due to the failure of 'end-of-pipe' measures to cope with environmental pollution. It was also influenced by the Brundtland report and the notion that environmental protection and economic growth were not a zero-sum game.[243] The Dutch constructivist Maarten Hajer agrees that the Brundtland report was a significant influence on reinterpretations of ecological modernisation, but he notes that the idea instead originated from a blend of three different texts: *Limits to Growth*, *Blueprint for Survival* and *Small is Beautiful* in the early 1970s.[244] Hajer also differs from Weale on the issue of the set of historical circumstances that facilitated the development of ecological modernisation. He suggests that ecological modernisation emerged due to the ideological split within radical green movements in the 1970s. This split resulted in some environmental groups advocating a more moderate environmental policy discourse. This discourse recognised that while 'the ecological crisis was evidence of a fundamental omission in the working of the institutions of modern society', societies *could* solve these ecological crises 'in accordance with the workings of the main institutional arrangements of society'.[245] Hajer remarks that this green notion that pollution prevention could pay was too irresistible for policy-makers not to adopt and embed itself within government institutions.[246] Regardless of their different conclusions on its conceptual origins, both Hajer and Weale argue that ecological modernisation is 'constructed' from a historical set of societal and political circumstances, rather than some suprahistorical stage of societal development.

So, what characteristics define the discursive take on ecological modernisation as opposed to *Molian* EMT? In many ways, its definition shares strong similarities with EMT. For instance, Weale argues that within an ecological modernisation belief system 'the character of environmental problems was well understood; that the environmental problems could be

[242] Milanez and Bührs 2007, 569.
[243] Weale 1992, 31.
[244] Hajer 1995, 33. See also Seippel 2000, 289.
[245] Hajer 1995, 3.
[246] Ibid, 4.

handled discretely; that end-of-pipe technologies were typically inadequate; and that in the setting of pollution control standards a balance had to be struck between environmental protection and economic growth and development'.[247] Hajer shares Weale's optimistic definition, stating that ecological modernisation is 'a policy strategy that is based on a fundamental *belief* in progress and the problem-solving capacity of modern techniques and skills of social engineering'.[248] He also notes that ecological modernisation recognises that modern institutions have created contemporary environmental problems, but assumes that existing political, economic, and social institutions can internalise the care for the environment through science and 'pollution prevention pays' techniques.[249]

The Australian academic John Dryzek has also explored 'ecological modernisation' in his work on 'environmental discourses'. He states that the 'storyline' of ecological modernisation is that 'the capitalist political economy needs conscious reconfiguring and far-sighted action so that economic development and environmental protection can proceed hand-in-hand and reinforce one another'.[250] Leveraging off the work of Weale and Hajer, he believes that the 'idea of ecological modernisation' rest on four key elements: (1) the business case for reducing waste dovetails with more efficient production; (2) postponing solutions for present environmental problems is considered a potentially expensive decision for future generations; (3) 'unpolluted and aesthetically pleasing environment means healthier, happier, and more productive workers, who may even willingly sacrifice wages and salaries for these environmental rewards'; (4) green industries are profitable (whether it is green consumer goods and services or pollution abatement products).[251]

In addition, Australian environmental sociologist Peter Christoff splits the 'normative version of ecological modernisation' into a 'weak' and 'strong' version.[252] Christoff views *weak* ecological modernisation as 'narrowly technocratic and instrumental', 'neo-corporatist', 'hegemonic' and Western-centric. Christoff contrasts this strand of ecological modernisation

[247] Weale 1992, 75.
[248] Hajer 1995, 33 (my emphasis).
[249] Ibid, 25-29.
[250] Dryzek 2013, 173.
[251] Ibid, 170-171. See also Hajer 1995, 25-29; Weale 1992, 75-79.
[252] Christoff, 1996.

with a *stronger* version that is more communicative, incorporates democratic aspects which maximise public participation, and considers the transnational character of environmental problems and the multitude of pathways towards ecological modernisation, with the view that environmental considerations trumped economic concerns in the ecological restructuring of modern institutions.[253] The stronger version, he believes, has the greater possibility of 'promoting enduring ecologically sustainable transformations and outcomes across a range of issues and institutions'.[254] (In fact, Zhang, Mol and Sonnenfeld employed Christoff's terms to characterise the aforementioned CASS report as a 'weak version' because it focuses on the 'technological economic dimensions of sustainable development, without entering too much into relations with equity, equality, citizen empowerment and the like').[255] Overall, the literature cited in this section illustrates that ecological modernisation, from a constructivist standpoint, can potentially provide new insights into the *motivations* that shape environmental reform.

Research Question and Hypotheses

Some pertinent research questions have emerged from this review of the literature surrounding China's environmental problems, environmental governance, and the authority of ecological modernisation to explain ecological restructuring and environmental reform in China. The key question centres on: have ecological modernisation ideas been incorporated into China's environmental policy agenda? If ecological modernisation ideas have influenced Chinese policymakers, then we will find evidence of those ideas in both the statements of Chinese officials and Chinese policy and legislation concerning key environmental reform measures. We will also find evidence of a convergence between economic development and environmental concern in both the statements of Chinese officials and Chinese policy and legislation dealing with key environmental reform measures.

Beyond that, other questions that are raised by this literature include: which institutions and officials have been the key advocates for the inclusion of ecological modernisation ideas within the Chinese government's environmental policy agenda? What concerns have been the key drivers for the inclusion of ecological modernisation ideas within the Chinese government's environmental policy agenda? To what extent have ecological modernisation ideas evolved

[253] Ibid.
[254] Ibid, 490.
[255] Zhang, Mol and Sonnenfeld 2007, 665.

within the Chinese government's environmental policy agenda? What techniques can researchers use to discover whether ecological modernisation ideas have been included within the Chinese government's environmental policy agenda?

Conclusion

This chapter started by tracing the origins of China's environmental problems to the Maoist and early Reform eras. From that foundation, studies have shown that in recent decades, market-based rapid industrialisation has placed intense pressure on China's environment. Yet Chinese authorities have been unable to effectively manage such ecological pressure, especially once China acceded to the WTO and undertook even further economic expansion. The chapter then examined the literature which explored how Chinese authorities responded to these burgeoning environmental problems. Since the early 1970s and the 'birth of Chinese environmental consciousness', the Chinese state has constructed an impressive array of environmental protection institutions, laws and policies. Moreover, it also has allowed new actors to emerge within the environmental protection sector, such as civil society, the media, citizens and foreign stakeholders. Despite these efforts, many China watchers still argue that the Chinese government needs to undertake further environmental reform to achieve positive, long-lasting environmental outcomes in China.

The third section of this chapter turned to a parallel sociological debate relevant to China's environment and governance: do China's environmental reforms provide evidence of ecological modernisation? The observations and debates generated from the earlier literature mentioned in this chapter laid the empirical groundwork for 'ecological modernisation' theorists to turn their attention to China. These theorists, who typically focused on environmental transformations in Western Europe, stressed that the Chinese 'environmental state' still needed to undergo further environmental reform. Yet, there were enough positive changes for some researchers to suggest that ecological modernisation is congruent with China's ongoing modernisation. The chapter ended by proposing that the constructivist interpretation of ecological modernisation has the potential to provide a useful conceptual framework for examining the motivations and mindset of China's environmental policymakers. Now that this chapter has identified the research problem of this thesis, the discussion will move to how researchers can determine whether ecological modernisation ideas have been included within the Chinese government's environmental policy agenda.

Chapter Three: A Sinology for Ecological Modernisation

The last chapter discussed how ecological modernisation theorists cast their eye towards China because of the Chinese government's policy responses to that country's deteriorating environment. China, they argued, was experiencing a unique version of ecological modernisation. The chapter concluded with the suggestion that a discursive, constructivist reading of ecological modernisation could potentially provide a useful framework to understand the motivation behind China's environmental policy reforms and could shed light on the theoretical controversies over the value of ecological modernisation within the Chinese context. From this discussion, a set of research questions emerged:

- If ecological modernisation ideas have been incorporated into the policy agenda, to what extent have these ideas evolved?
- Which institutions and officials have been the critical advocates for the inclusion of ecological modernisation ideas within the Chinese government's environmental policy agenda?
- What concerns have been the key drivers for the inclusion of ecological modernisation ideas within the Chinese government's environmental policy agenda?

This chapter outlines the methodology that I adopted in answering those questions. It begins with a personal reflection on how my research evolved into its current state, noting how my difficulties with applying ecological modernisation theory (EMT) to China's power generation industry led me to realise that a discursive understanding of ecological modernisation could potentially present a more useful lens to explore changes in China's environmental policy agenda. From that discussion, I integrate the 'themes' of *Molian* EMT into the existing constructivist literature on ecological modernisation to generate the discursive indicators for my research. The rest of this chapter outlines my case studies and how I operationalised my research questions and hypothesis to gather the evidence needed to explore the role of ecological modernisation ideas within China's environmental reform measures.

Applying Ecological Modernisation Theory to China's Power Generation Industry

When I first commenced my research, I wanted to evaluate Arthur Mol's claim that ecological modernisation was occurring in China.[256] Based on my review of the literature, I believed that early evidence existed to justify the use of EMT as a theoretical framework to examine in more depth the environmental shifts occurring in China's power generation sector. I chose this industry because of my interest in its critical significance for China's ongoing modernisation. I also broadened my focus beyond the renewable energy industry because I wanted to explore whether the process of ecological modernisation affected industries that utilise traditional generating technologies, such as coal-fired power and hydropower. That choice seemed appropriate because hydropower and coal-fired electricity comprised the vast majority of China's installed electricity capacity.[257] However, I eventually discovered that this approach opened up a set of difficulties as to how I could measure the *process* of ecological modernisation within China's power generation industry. The main difficulty I faced centred on operationalising EMT. Although the EMT literature had established a set of 'themes', or theoretical indicators, in reality the interpretation of these themes seemed arbitrary and heavily influenced by the subjective values of the researcher (an example is the hydropower industry, discussed immediately below). Because of this methodological 'fuzziness', it was difficult to find categorial evidence to support the claim that the process of 'ecological modernisation' was occurring. Here the looseness that neo-Marxists identified in EMT emerged as a real problem.[258]

China's hydropower industry provides an excellent example of the methodological concerns that materialised in the preliminary stages of my research. (A similar case could also be made for the coal-fired power industry and renewable industry). To give a brief context of hydropower in China, it has undergone significant expansion since Chinese authorities first released the sluice gates of the Three Gorges Dam hydropower plant in 2003.[259] Since then,

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[256] Albeit uniquely, see Chapter Two.
[257] Zhongguo dianli qiye lianhehui. 2019. "2018 Nian dianli tongji nian kuaibao jiben shuju yilanbiao" (2018 electricity statistics annual express bulletin: basic data list), http://www.cec.org.cn/guihuayutongji/tongjxinxi/niandushuju/2019-01-22/188396.html. Accessed 22 June 2019.
[258] See Chapter Two.
[259] Wang Yichen. 2018. "Sanxia jituan: yinling Zhongguo shuidian yong pan xin gaofang" (Three Gorges Group: leading China's hydropower to climb new peaks), Xinhua wang, 17 December, http://www.xinhuanet.com/power/2018-12/17/c_1210016832.htm. Accessed 22 June 2019; Zhongguo dianli qiye lianhehui. 2019.

China's generation of hydroelectricity has grown from 283.7 Terawatt-hours (TWh) to 1155.8 TWh in 2017 (just under 18 percent of total production).[260] State-owned enterprises (SOEs) and government officials are strong advocates of hydropower because of its 'abundance' in China's southwest – a coal-poor region. Over one-quarter of all electricity generated in China comes from hydroelectricity.[261]

On a broad level, China's rapid hydropower expansion could provide evidence that the process of ecological modernisation is occurring. More hydroelectricity means less coal and, consequently, less emitted carbon and air pollutants. Chinese officials have understood this for several decades. In 1983, then minister of the former Ministry of Water Resources and Electric Power[262] Qian Zhenying 钱正英 stated that 'hydropower is comparatively economical and clean energy'.[263] When calling for more expansion in the hydropower industry, Chinese officials often extolled the benefits of hydroelectricity, specifically, whether it is small- or large-scale hydropower.[264] For instance, Chen Lei 陈雷, the longstanding minister of the Ministry of Water Resources[265] (MWR), argued that China's small hydropower of 80 GW in 2000 involved a saving of 30 million tonnes of coal, equivalent to 72 million tonnes of carbon dioxide.[266] Jiao Yong 矫勇, a vice-minister and chief engineer at the MWR, also noted in a 2009 paper that the Three Gorges Dam's 22.5 GW installed generating capacity reduced the consumption of 74.8 million tonnes of coal each year, thereby reducing China's carbon dioxide emissions.[267] Although an argument could be mounted concerning the 'Jevons Paradox'[268],

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"2018 Nian dianli tongji nian kuaibao jiben shuju yilanbiao" (2018 electricity statistics annual express bulletin: basic data list), http://www.cec.org.cn/guihuayutongji/tongjxinxi/niandushuju/2019-01-22/188396.html. Accessed 22 June 2019.

[260] Hydroelectricity statistics taken from BP 2019. "Statistical Review of World Energy – all data (1965-2018)," https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/downloads.html. Accessed 22 July 2019.

[261] BP 2019. "Statistical Review of World Energy – all data (1965-2018)," https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/downloads.html. Accessed 22 July 2019.

[262] Chinese name was 水利电力部.

[263] Qian Zhengying 1984, 4.

[264] Chen Lei 2002; Jiao Yong 2009.

[265] Chinese name is 水利部.

[266] Chen Lei 2002, 12.

[267] Jiao Yong 2009, 1.

[268] The Jevons Paradox (or 'rebound effect') was named after William Jevons an economist who argued that more efficient coal use would result in more, rather than less, coal consumption because the cheaper-cost of coal encouraged more innovation in coal-consuming technologies, see Jevons 2001 [1865].

these statistics support China's officials backing of hydropower: less carbon and pollution are emitted into the atmosphere because of China's new hydroelectricity expansion.

Hydropower can also have positive influences that extend beyond reducing coal-derived carbon emissions and air pollution. Hydropower development, especially small hydropower or 'rural hydropower' (农村水电), provides electricity to homes that traditionally had to resort to biomass for their heating and cooking. Resorting to such fuel has been a lead contributor to deforestation in China. In 2002, minister of the MWR, Wang Shucheng 汪恕诚, stated that 'rural hydropower was the "leader" in water projects for mountainous regions' and that '15 years of rural electrification has resolved the problem of 120 million people without power'.[269] The result of this electrification, he claimed, was the reduction in approximately 300,000 acres of felled forest each year, or 9 million cubic metres of wood products harvested.[270] His successor, Chen Lei, expressed the same sentiment several years later. Writing in *Small Hydropower* in 2011, Chen announced that because of the 'construction of 236 small hydropower replacing fuel combustion projects' over the preceding 5-year period, over '460,000 rural homes had their fuel problem resolved', which resulted in the 'protection of roughly 900,000 acres of forests'.[271] Chinese companies have also undertaken locally-designed innovation to improve the efficiency of hydroelectricity generation through developments in generator technology and advances in hydrology.[272] China has also invested in technology to reduce the environmental impact of large-scale dams. Dams unnaturally block fish migrations, so some Chinese engineers have implemented fish ladders and artificial breeding in an attempt to ensure that concrete dams do not negatively impact fish species. Moreover, innovations have occurred concerning how reservoirs are managed to reduce dry stream beds and better manage dam and river temperature levels.[273] These examples illustrate that an argument could be mounted that ecological modernisation is occurring in China. Hydropower has modernised parts of China's society that previously relied on traditional forms of energy. Moreover, Chinese companies are implementing technology and better management practices to reduce the environmental impact of dams.

[269] Wang Shucheng 2002, 12.
[270] Ibid, 13.
[271] Chen Lei 2011, 1.
[272] Jia 2016.
[273] Chen et al. 2019.

Despite these perceived benefits, hydropower expansion has negatively impacted China's environment. This fact I could not disregard. The anti-dam NGO International Rivers states that 'while water is a renewable resource, the rivers and the ecosystems that they sustain – including floodplains, wetlands, estuaries and marine environments – are not renewable. Given the serious, irreversible ecological impacts of dams, dam-based hydropower cannot be considered a renewable source of power'.[274] Chinese language research exists that focuses on the environmental (and social) problems caused by China's hydropower expansion. For instance, International Rivers funded a report by a group of Chinese scientists on hydropower development in China which argues that:

> rivers are ancient complex ecosystems, the value of these systems and the resources they provide are much more than mere power generation. Rivers maintain the health of the ecosystems and as they shaped ancient civilisations in the past, today they provide services that support the whole economy… [d]ams alter the natural flow of rivers, resulting in the reduction and extinction of rare fish species. Upstream hydropower development dries up rivers and lakes in the downstream, Dongting Lake and Poyang Lake being the most shocking examples in China. Dams in the southwest regions inundate fertile valley land, and compromise self-purification capacity of rivers, which causes serious pollution in reservoirs. The cumulative effect of cascade dams can cause ecological losses and dry up rivers, which ultimately will affect human beings at the top of the food chain. Moreover, the ecological remedy measures designed to decrease dams' impact have failed repeatedly. The dams on Jinsha River and Shuiluo River, as well as Xiaonanhai Dam have significantly compromised river ecosystems. The damage is not just caused by construction of the dams, but also by mismanagement and irrational decision-making linked to ignoring existing laws to protect rivers.[275]

In this report, the ecological consequences of hydropower are interpreted negatively. Rather than viewing hydropower as a contributor to minimising climate change and limiting deforestation, critics view dams as human-made structures that disrupt and damage river ecology.[276] These ecological impacts raised some crucial methodological questions in my research: should I emphasise examples where technological innovations or improved management of dams have made hydropower generators more environmentally sustainable? Should I centre my attention on cases where power generators have continued to use less than best-practice technology? Linked to this, how many of China's 50,000 dams would I need to scrutinise before I could be confident that I had a representative sample that would afford me

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[274] International Rivers. 2013. "Hydropower," 26 March, https://www.internationalrivers.org/resources/hydropower-7901. Accessed 24 May 2014.
[275] Li, Bo, Songqiao Yao, Yin Yu and Qiaoyu Guo. 2014. "The "Last Report" On China's Rivers," International Rivers, https://www.internationalrivers.org/sites/default/files/attached-files/final_rivers_report_english_small.pdf. Accessed 11 March 2015, 4; Chinese version is Li Bo, Yao Songqiao, Yu Yin, Guo Qiaoyu. 2013. "Zhongguo jianghe de 'zuihou' baogao zhongguo minjian zuzhi dui guonei shuidian kaifa de sikao ji 'shisanwu' guihua de jianyi" (The "last" report of China's rivers: thoughts on Chinese hydropower development by Chinese civil organizations and suggestions for the 13th Five-Year Plan), International Rivers, 24 December, https://www.internationalrivers.org/sites/default/files/attached-files/final_rivers_report_20140218_small.pdf. Accessed 11 March 2015.
[276] Ibid.

the confidence to conclude that ecological modernisation has reached a watershed moment concerning hydropower?

A further issue was how my research should scrutinise hydropower projects that were cancelled on purported ecological grounds. The example of the Nu River (怒江, also known as Salween River) in Yunnan provides an excellent example of this conundrum. In the early 2000s, the Chinese government had initially allowed the SOE Huadian (华电) the right to construct thirteen cascade dams with a planned overall capacity of 21.3 GW without an environmental impact assessment.[277] The project soon drew heavy criticism from environmental NGOs, scientists and local environmental bureaucrats because of the lack of an environmental impact assessment and because they believed the project would negatively impact the 'Three Parallel Rivers' (三江并流) region, which the United Nations had recently declared a World Heritage Site.[278] In particular, civil society stakeholders, such as China Rivers Network (a consortium of seven NGOs in China), played an essential part in mobilising attention towards the environmental impacts of hydropower and the need for rigorous and transparent environmental impact assessments. The critique of the hydroelectric project culminated in February 2004 when Premier Wen Jiabao 温家宝 stated that 'such a large hydropower station project that draws high social attention, and has environmental controversy, should be cautiously studied, and scientifically decided'.[279] Two months later he placed a moratorium on damming the Nu River.[280] Studies have shown that the NGOs played a significant role in drawing Wen's attention to the environmentally problematic nature of the project.[281] Again, the role of civil societal (and non-state or quasi-state) stakeholders in driving environmental reform could present as evidence for ecological modernisation. Mol and others have explored how civil society has influenced ecological restructuring in late-modern nations.[282]

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[277] Watts, Jonathan. 2011. "China's big hydro wins permission for 21.3GW dam in world heritage site," The Guardian, 2 February, https://www.theguardian.com/environment/2011/feb/01/renewableenergy-china. Accessed 23 May 2018; Magee and McDonald 2006, 47.
[278] Magee and McDonald 2006, 39-40.
[279] Quoted in Mertha 2009, 1005.
[280] Ibid.
[281] Mertha 2008; Hensengerth 2014
[282] See Chapter Two.

However, my research also led me to question how much emphasis should be placed on the influence of perceived adverse environmental outcomes within the government's overall decision to halt dam construction. Although protecting the biodiverse flora and fauna of the Nu River was a consideration, social costs also heavily influenced the political leadership. Installing the proposed thirteen dams would have inundated villages within the Nu River valley and led to the forced relocation of at least 50,000 people.[283] (Chinese environmental impact assessments take into account social impacts).[284] The Nu River presents just one example, albeit prominent and significant, of large-scale dams being halted on environmental grounds. Conversely, the Lancang River 澜沧江 (also known as the Mekong River), also in Yunnan, has undergone significant transformation, with over twenty dams proposed to be built along the waterway and seven large dams already built.[285] Once completed, the dams along the Lancang River will have an installed capacity of over 30 GW of hydroelectricity, considerably larger than the planned overall capacity for the Nu River. Although the specific environmental impacts of damming the Lancang River vary compared with the Nu River because of differing geography, the overall environmental impacts remain the same with problems for biodiversity and river systems.[286] Overall, I was left with more questions than answers with respect to whether ecological modernisation was underway within the hydroelectricity industry.

From my preliminary research, I could have concluded that the hydropower industry was a weak case study to examine ecological modernisation in China and tried to find a more appropriate case study. However, EMT's proponents presented their theory as a universally applicable approach to understanding the manner in which societies ecologically restructure.[287] Although Mol principally derived the theoretical aspects of ecological modernisation from his evaluation of the chemical industry in the Netherlands, he did not preclude any industries from the theory's purview. Moreover, technological advances in hydropower suggested that the industry had progressed and, in some instances, become more environmentally sustainable. I could have also determined that ecological modernisation was in its infancy in China, and yet to reach a breakthrough moment. However, the point at which I could label an event or project

[283] Magee and McDonald 2006, 40; Tullos et al. 2013.
[284] Gao 2001.
[285] Yeophantong 2014; International Rivers. 2013. "Lancang River Dams: Threatening the Flow of the Lower Mekong," August, https://www.internationalrivers.org/sites/default/files/attachedfiles/ir_lacang_dams_2013_5.pdf. Accessed 21 January 2019.
[286] Urban, Siciliano and Nordensvard 2018, 762.
[287] Mol 2006, 33.

as an instance of ecological modernisation was unclear. The result of this initial groundwork is that I could also have tentatively resolved that the process of ecological modernisation was either lacking or stymied in China's hydropower industry. With more questions than answers emerging from my preliminary investigation, my research had reached an impasse.

By contrast to the difficulties I encountered in operationalising EMT, my exploration of the discursive aspect of the theory was more productive. The last of the theory's themes centres on an ecologically-grounded discourse, or 'environmental rationality', that challenges the economic-based discourse, or 'economic rationality'.[288] No longer does economic rationality dominate the ecological. I was able to find policy statements from senior Chinese government policymakers that shed light on how they interpreted hydropower development within the broader context of China's environmental problems.

Reflecting on their statements caused me to re-examine my focus on this *process* of ecological modernisation. I could have decided to continue my exploration of ecological modernisation in China as a social process, even if that emphasis meant that the bulk of material uncovered in my research was centred on discursive material. However, it seemed more relevant in light of this new evidence to explore in greater depth the idea or discourse of ecological modernisation in China and see whether Chinese policymakers viewed environmental reform and economic development from an ecological modernisation mindset. This new research focus would allow me to undertake an intellectual history and explore the environmental policy 'first principles' of these officials, by examining the institutions and officials that promote what sound like ecological modernisation views.

Research Case Studies

With this new approach, I formed the realisation that the power sector was unduly restrictive of my research aims to study the value of ecological modernisation in the Chinese context. However, while exploring the discourse of Chinese ministers and policy researchers, I would often find them referring to ideas such as 'sustainable development' (可持续发展), 'cleaner production' (清洁生产), 'circular economy' (循环经济), 'green GDP' (绿色 GDP), 'environmentally friendly society' (环境友好型社会), 'low-carbon economy' (低碳经济), 'green economy' (绿色经济) or 'ecological civilisation' (生态文明) when justifying environmental projects and legislation

[288] See Chapter Two.

relevant to the power generation industry. Through further exploration, I noticed that these concepts went into more depth than political slogans such as 'conserve energy and reduce emissions' (节能减排), avoid the path of 'pollute first, clean up later' (先污染后治理) or 'give priority to prevention' (以防为主).[289] Beyond that, *prima facie* evidence existed in the statements of these officials for me to believe that these concepts aligned with ecological modernisation.[290] (This was not a surprising revelation as Arthur Mol had noted that ecological modernisation was congruent with circular economy, green GDP and cleaner production, see Chapter One). I also noticed after a broader investigation that these concepts were not just applicable to the power generation industry. They were used in a broader sense to frame China's overall environmental reform.

Consequently, I broadened my focus from the power generation industry to include five general concepts of environmental reform that have occurred since the early 1990s in China: 'cleaner production' in Chapter Five; (2) a 'circular economy' in Chapter Six; (3) a 'green GDP' in Chapter Seven; (4) a' low-carbon economy' in Chapter Eight; and (5) an 'ecological civilisation' in Chapter Nine. For reasons of space and accessible material, I chose not to explore 'environmentally friendly society' and 'green economy'. Based on similar space constraints, I also chose not to explore the policy discourse of 'sustainable development' in depth, deciding to weave it through all of my data chapters. This seemed like an appropriate choice as Chinese officials referred to sustainable development as an overarching guiding principle to guide China's environmental reforms.

Figure 3.1 illustrates why I decided upon the chronological structure of this thesis. Many of these ideas I identified overlapped, but I detected a chronological pattern starting with cleaner production and finishing with ecological civilisation. The preliminary discussions of these concepts were also largely characterised by a chronological configuration – except for low-carbon economy and ecological civilisation.

[289] See, for example, Qu Geping 1994a; Zhu Dajian 1998; Xie Zhenhua 2001; Pan Yue 2004a, 2004b.
[290] See statements by Mol et al. in Chapter Two.

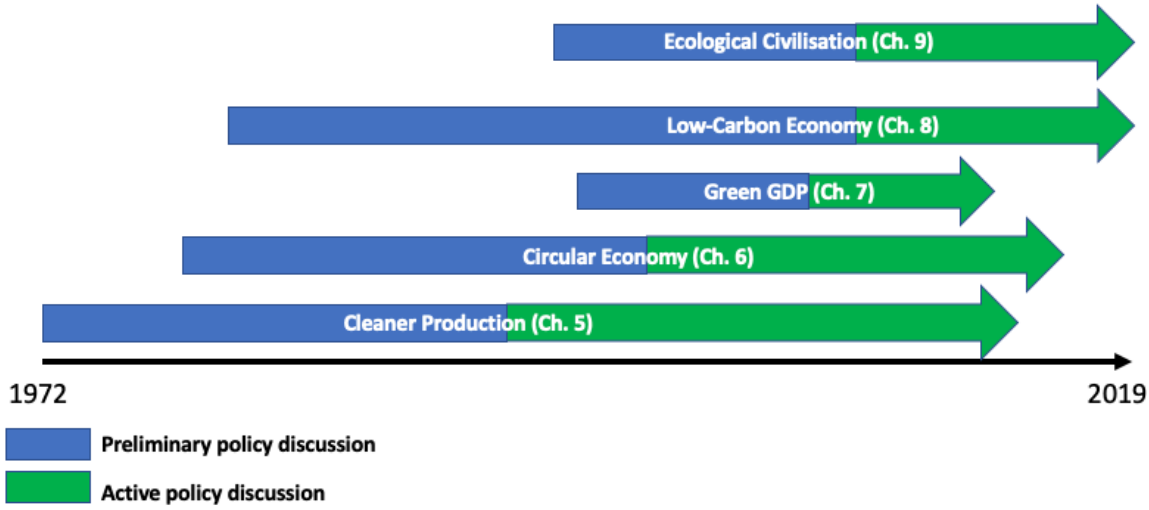

Figure 3.1: Thesis Concepts and Chronology

Overall, I found these concepts allowed me to explore the following questions:

- If ecological modernisation ideas have been incorporated into the policy agenda, to what extent have these ideas evolved?
- Which institutions and officials have been the critical advocates for the inclusion of ecological modernisation ideas within the Chinese government's environmental policy agenda?
- What concerns have been the key drivers for the inclusion of ecological modernisation ideas within the Chinese government's environmental policy agenda?

A Useful Heuristic? Ecological Modernisation Discourse and Chinese Environmental Reforms

To answer the above questions, I employed what could be termed a 'discourse analysis' to examine whether ecological modernisation ideas have been incorporated into China's environmental policy agenda. Marteen Hajer defines 'discourse' as 'an ensemble of ideas, concepts, and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices'.[291] For him, the value of discourse analysis is that it allows for a:

[291] Hajer 2006, 67.

> better understanding of controversies, not in terms of rational-analytical argumentation but in terms of the argumentative rationality that people bring to a discussion. Hence discourse should be distinguished analytically from discussion so as to allow for the differentiation of plural discourses. Discourses consist of structures embedded in language. Discourses are therefore 'found' or traced by the analyst. Discourses might not be immediately obvious to the people that utter them, although respondents should recognise a discourse when pointed out to them by the analyst.[292]

I focused my attention on an 'ecological modernisation discourse' to see whether such indicators appear in China's environmental policy agenda. Adapting Hajer, I use the term 'discourse' interchangeably with *ideas, narrative, perspective, mindset, beliefs, notion, views*, among other terms.

Furthermore, my research also treats *ecological modernisation discourse* as just one of a range of environmental discourses that emerged from the 1960s onwards. As John Dryzek, in *The Politics of the Earth: environmental discourses,* notes:

> environmentalism is composed of a variety of discourses, sometimes complementing one another, but often competing. A discourse is not like a tribe. Particular individuals may partially inhabit competing discourses that make claims upon them. An individual working in a government environmental agency may be an administrative rationalist at work, a green radical in conversations with friends, an economic rationalist in buying and selling. The individual may sometimes have to think long and hard when these discourses pull in different directions, opening space for reflection.[293]

Although there are other environmental discourses that I could potentially explore such as *administrative rationalism*, *democratic pragmatism*, and *economic rationalism*, I have focused on ecological modernisation and its antithesis, *development* discourse, or 'economic rationality'.[294] According to Dryzek, 'the impetus of economically rational systems is to maximise production', and the 'prime value is economic efficiency'.[295] Because the PRC has operated under differing economic systems in its relatively short history, economic rationality is defined more broadly. In particular, in a capitalist market system, economic rationality manifests as a mindset or set of beliefs that value expansion of production efficiently and profitably. For a centrally planned – or command – economic system, the rationality reveals itself in the objective to maximise production. I will situate the economic rationality of China's leaders within the context of China's post-1978 economic reforms in Chapter Four.

The principal methodological task for answering the questions framing this thesis involved defining the conceptual characteristics of an ecological modernisation discourse. Arthur Mol

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[292] Ibid, 68.
[293] Dryzek 2013, 22.
[294] For a range of those environmental discourses, see Dryzek 2013.
[295] Dryzek 1987, 55-56.

(and his colleagues) primarily looked at ecological modernisation from an empirical standpoint in order to reveal the existence of the process of ecological modernisation. Despite my scepticism over the possibility of coming to some agreement on such characteristics (as shown in my example on hydropower) I argue that their work can contribute to the 'discourse of ecological modernisation'. In Chapter Two, it was noted that *Molian* EMT contains five key themes that characterise the process of ecological modernisation based on the examination of ecological restructuring in Western Europe. In this thesis, I have re-evaluated them as discursive indicators of ecological modernisation and integrated their work with the constructivist literature of Dryzek, Hajer, and Weale.[296] During the early stages of my research, I was struck by how the ideas of Mol emerged in statements by Chinese officials. This made me consider whether Mol's work could contribute to the constructivist literature. A perspective that integrates the constructivist and realist readings of ecological modernisation has the potential to provide an insightful conceptual lens to determine whether Chinese policymakers have incorporated ecological modernisation ideas into their environmental policy agenda. Drawing from the work of Weale, Hajer, Dryzek and Mol et al., I generated seven discursive indicators of ecological modernisation[297]:

1. The belief that development should balance ecological[298] and economic rationality;
2. The belief that science and technological innovation will reduce, rather than increase, environmental impact;
3. The belief that environmental reforms based on capitalist economic principles will not only reduce environmental impact but also foster profitable green industries;
4. The belief that postponing policy solutions for existing environmental problems is a risky economic decision for future generations;
5. The belief that 'decentralised, flexible and consensual styles of governance', as well as the inclusion of 'non-state actors' that assume 'traditional administrative, regulatory, managerial, corporate, and mediating functions of the nation-states' can manage and solve some environmental problems better than governments;

[296] See Chapter Two.
[297] Weale, 1992; Hajer 1995; Mol 2010b; Dryzek 2013.
[298] *Ecological rationality* is defined as the valuing of the 'productive, protective and waste-assimilative [functions]...of eco-systems', see Dryzek 1987, 34.

6. The belief that the increased involvement of social movements in environmental reform and policymaking, whether through civil society or political parties, can assist in better management of environmental problems;
7. The reflexive belief that modernisation will be more environmentally sustainable if it eschews past polluting and damaging practices of development and industrialisation.

I then sought to identify whether these conceptual indicators of ecological modernisation emerge in the policy discourse of Chinese officials and institutions. I considered that by doing this, I would be able to determine whether ecological modernisation ideas have been incorporated into China's environmental policy agenda.

I considered what research methods could assist in identifying an ecological modernisation discourse. Marteen Hajer has identified several methods that should form part of discourse analysis:

> 1. *Desk research*: general survey of the documents and positions in a given field; newspaper analysis, analysis of news sections in relevant journals. This all to make a first chronology and come up with a first reading of events;
>
> 2. *Helicopter interviews*: interviews with three or four actors ('helicopters') that are chosen because they have the overview of the field be it from different positions. They might comprise a well-informed journalist, a key advisor to the government, an expert-policymaker;
>
> 3. *Document analysis*: analysing documents for structuring concepts, ideas and categorisations; employment of storylines, metaphors, etc. This should result in a first attempt at defining structuring discourses in the discussion. At this stage one would get a basic notion of the process of events as well as the sites of discursive production;
>
> 4. *Interviews with key players*: on the basis of the proceeding steps interviews can be conducted with central actors in the political process. The interviews can be used to generate more information on causal chains that will always be the assumed core of the meeting on [the] part of the interviewees, but the interviews might also be used to get a better understanding of the meaning of particular events for the interviewees.
>
> 5. *Sites of argumentation*: searching for data not simply to reconstruct the arguments used but to account for the argumentative exchange. Examples might be parliamentary debates, minutes of inquiries (a very rich source), presentation and interpretation of evidence presented to a particular research commission, panel discussions at conferences.
>
> 6. *Analyse for positioning effects*: actors can get 'caught up' in an interplay. They might force others to take up a particular role, but once others are aware of what is going on, they might also try to refuse it (indicators: 'No, that is not what I meant', 'That is not what it is about at all'). This positioning not only occurs on the level of persons but can of course also be found among institutions or even nation-states;
>
> 7. *Identification of key incidents*: this would lead to the identification of key incidents that are essential to understand the discursive dynamics in the chosen case. As much as possible these key incidents are then transcribed in more detail allowing for more insights in which determined their political effects;

> 8. *Analysis of practices in particular cases of argumentation*: rather than assuming coherence on [the] part of particular actors, at this stage one goes back to the data to see if the meaning of what is being said can be related to the practices in which it was said.
>
> 9. *Interpretation*: on this basis one may find a discursive order that governed a particular domain in a particular time. Ideally, one should come up with an account of the discursive structures within a given discussion, as well as an interpretation of the practices, the sites of production that were of importance in explaining a particular course of events.
>
> 10. *Second visit to key actors*: discourses are inferred from reality by the analyst. Yet when respondents are confronted with the findings, they should at least recognise some of the hidden structures in language. Hence to revisit some key actors is a way of controlling if the analysis of the discursive space made sense.[299]

Document analysis constitutes a crucial part of this thesis's methodology. I examined several hundred Chinese-language policy documents, speeches, articles, and interviews with Chinese institutions and government officials to determine whether China's environmental policy agenda contained ecological modernisation ideas. As Hajer notes above: 'discourses are inferred from reality by the analyst'.[300] Consequently, I was not looking for instances where the concept of ecological modernisation was explicitly discussed in documents. Instead, I was more concerned with those documents that indicated ecological modernisation through the policy statements of China's officials and institutions. In guiding my analysis, I used the seven discursive indicators of ecological modernisation listed above.

Initially, it was necessary to demarcate what constitutes appropriate 'policy discourse' or a suitable 'discursive actor'. Due to China's large population, the sheer amount of Chinese-language discourse generated is immense, even in the field of environmental policy. It comes from a diverse range of stakeholders across Chinese politics and society – some relevant such as from Party and government organs, some of lower value, such as from most academics and journalists. Because of the large volumes of material, as a researcher I needed to determine what was relevant evidence and make judgements concerning the weight they place on certain voices. Accordingly, I ensured that my research focused on the influential policy discourses in China, such as institutions and officials from the CCP, PRC Government, and National People's Congress. Chapter Four will explain the essential context of these three institutions in

[299] Hajer 2006, 57-58.
[300] Ibid, 74.

further detail, but, for now, I will explain how each institution contributed to the data collection for this thesis.

First of all, any study that scrutinises topics relevant to China's political-economy needs to take into account the central importance of 'The Party'.[301] Due to its central position within Chinese politics, I targeted the policy discourse created by the most powerful Party officials in China such as CCP General Secretaries and members of the Politburo[302] and Politburo Standing Committee[303] (PSC), dating back to the 1950s. Often high-level politicians remain above specific or in-depth discussion of environmental policy, so their use of ecological modernisation ideas in any policy commentary (speeches, articles, and interviews) can demonstrate the persuasiveness of these ideas. For example, if a high-level Party cadre such as a member of the PSC had delivered a speech endorsing ecological modernisation ideas as a core element, then I determined that the speech provided evidence of the importance that this cadre had placed on incorporating such ideas within China's environmental policy agenda. I also focused my attention on the relevant Party officials who, while lower in rank than the PSC members, nevertheless held positions relevant to the environmental policymaking, either in a government position or a leading small group.

Beyond Party officials, I also examined relevant Party statements dating back to the 1950s from Party websites and online databases to see whether they included indicators of ecological modernisation. The importance of examining CCP documents for this research is that, because of the authority of the Party within Chinese politics, they allow me to determine the extent to which ecological modernisation ideas have influenced China's environmental policy agenda. For example, if the Central Committee of the CCP[304] issues a Party document that incorporates ecological modernisation ideas then this document reflects the ideological and national significance of these ideas for the Party and the Party's leadership. If they view environmental reform as a relatively minor policy issue, then they will leave it to the government (see below).

[301] McGregor 2010.
[302] Chinese name is 政治局.
[303] Chinese name is 政治局常委.
[304] Chinese name is 中国共产党中央委员会.

Government policy documents also served as a core source of information for this thesis. The State Council presides over government organs and it often signals policies to subordinate bureaucratic units through the release of 'documents' (公文) that outline its policy position with varying degrees of policy importance.[305] Through government websites and online databases, I examined State Council documents to determine whether policy documents discussing key environmental reforms contained ecological modernisation values. I also examined policy documents created by various 'ministries' (部), 'commissions' (委员会), 'administrations' (总局), 'bureaus' (局), and 'leading small groups' (领导小组) along with other bureaucratic organs, that have regulated, administered, formulated and coordinated environmental policy. I primarily focused on these institutions because existing literature has confirmed that they have played an essential role in environmental reform: National Environmental Protection Leading Small Group (1974–1982), Ministry of Urban and Rural Construction and Environmental Protection (1982–1987), National Environmental Protection Commission[306] (1984–1998), State Environmental Protection Bureau (1987–1998), State Environmental Protection Administration (1998–2008), Ministry of Environmental Protection (2008–2018), and Ministry of Ecological Environment (2018–present). However, because China had recently experienced what some scholars have termed a 'greening of economic agencies'[307], I decided to broaden my investigation to include government organs from the economic sectors of China's bureaucracy, such as the State Planning Commission[308] (1954–1998), State Economic and Trade Commission (1993–2003), State Development Planning Commission[309] (1998–2003), National Development Reform Commission (2003–present). My rationale for this broadening of my universe of discourse was based on the *Molian* premise that under ecological modernisation conditions, economic and ecological rationalities should merge, rather than be treated as opposites.

Because my research sought to trace the source of environmental ideas, this necessitated that I focus on the policymakers within government ministries. I therefore surveyed the policy commentary of officials in government institutions, drawing on online databases. I explored

[305] For instance, 'regulations' (条例) 'orders' (命令), 'replies' (批复), 'notices' (通知), 'reports' (报告), 'opinions' (意见), 'decision' (决定), 'suggestion' (建议) and 'announcements' (公报), among others, see McElwee 2011, 78.
[306] Chinese name is 国家环境保护委员.
[307] Shi and Zhang 2006.
[308] Chinese name is 国家计划委员会.
[309] Chinese name is 国家发展计划委员会.

their speeches, articles and media interviews relating to the environmental reform concepts that constitute the empirical chapters of this thesis. I centred my attention primarily on the senior-level officials within the government, for example, 'chairman' (主任), 'vice-chairman' (副主任) 'minister' (部长), 'vice-minister' (副部长), 'director' (局长), and 'deputy director' (副局长), because their views carried more weight than their subordinates. However, because I sought to determine which particular institutions embraced a particular concept, such as 'cleaner production' or 'circular economy', I also focused on researchers and policymakers at lower levels to see whether they discussed the term prior to more prominent public announcements by their superiors. This allowed me to understand the congruency of arguments between lower and upper levels of China's government institutions, as well as understanding the genealogy of these concepts within the Chinese context.

Lastly, I also examined Chinese legislation passed by China's NPC, referred to as the 'supreme State organ of power and legislation.[310] As China's primary legislature, it votes on legislation after its various committees review the proposed laws. The importance of the NPC for my research is that it permits me to establish whether ecological modernisation ideas have been embedded in the legislation of the PRC. If Chinese authorities decided to pass legislation that contains ecological modernisation views, then this provides the clearest evidence that such views have influenced China's environmental policy agenda.

I also supplemented an examination of documents from the above institutions with an exploration of academic discussions. These provided a critical early history for the concepts that I explored in this thesis. Academic discourse in China is subject to restrictions. The Western notion of 'academic freedom' is incongruent with the political control that the CCP wishes to exercise over governmental institutions (see Chapter Four). Nevertheless, academics are typically permitted to publish what they want as long as they abstain from attacking the legitimacy of the Party or they refrain from touching on topics that embarrasses governing authorities.[311] Because authorities legitimised the notion of 'environmental protection' in China in the early 1970s (see Chapter Two), the discussion of environmental policy solutions has become less ideological, especially after the Mao and 'Gang of Four' years. Therefore,

[310] Renmin wang. 2003. "The National People's Congress," http://en.people.cn/data/organs/npc.shtml. Accessed 24 July 2018.
[311] Zha 2015.

Chinese academics have been relatively free to discuss environmental policy reform measures as long as these discussions do not encourage changes in environmental governance that weakens the control of the CCP or publish empirical evidence (statistics, interviews, photos) that demonstrates or suggests government maladministration.

I also reviewed relevant official media reports to indicate when environmental policy reform discussions entered the media domain. Similar to academics, China's official (and non-official) media are not free to discuss any topic of public interest.[312] The CCP can try to restrict any information entering the public domain that questions the actions of Chinese politicians. They do this through the CCP Central Committee's Propaganda Department[313] which gives directives to media outlets on material they can or cannot disseminate to the public. This arises as a potential issue as some of the environmental issues that this thesis examined were or remain, to an extent, politically sensitive. One example is the government's policy stance on industrial pollution. Policy action on the environment is inextricably linked to the continuation of China's remarkable economic development as the Party sees continued economic growth as the source of its political legitimacy in the post-Maoist era (see Chapter Two and Chapter Four). In 2015, the environmental documentary 'Under the Dome' (穹顶之下) by former China Central Television journalist Chai Jing 柴静 spread across Chinese social media as its material concerning the costs of mounting environmental pollution and perceived local government inaction resonated with the public. In a matter of days, it had amassed hundreds of million views.[314] Initially, China's central government officials were supportive of the documentary. The newly-appointed minister of the Ministry of Environmental Protection (MEP), Chen Jining 陈吉宁, likened Chai Jing to Rachel Carson, noting that he sent her a text message to congratulate her on the documentary.[315] However, because the release of the documentary coincided with the 'Two Conferences' (两会), when the yearly NPC and Chinese People's

[312] Baum 2010; Jiang 2011.
[313] Chinese name is 中国共产党中央委员会宣传部.
[314] Tran, Mark. 2015. "Phenomenal success for new film that criticises China's environmental policy," The Guardian, 2 March, https://www.theguardian.com/world/2015/mar/02/china-environmental-policy-documentary-under-the-dome-chai-jing-video. Accessed 25 June 2018.
[315] Tan, Hao. 2015. "China's 'Silent Spring' has many more political hurdles to jump," The Conversation, 19 March, http://theconversation.com/chinas-silent-spring-has-many-more-political-hurdles-to-jump-38604. Accessed on 23 March 2016.

Political Consultative Conference[316] are held, Chinese authorities wanted to limit the discussion of the documentary in print and online in case the discussion conflagrated into more pointed questions concerning the CCP's handling of China's environment. Thus, the CCP's Propaganda Department released an edict to all media outlet stating that 'they must absolutely discontinue coverage of the documentary "Under the Dome" and its creator, as well as reports, commentaries, interviews, and special topics that concern or extend to this film and its creator'.[317] Nonetheless, the Party's control over the media only provides a minor constraint on this research, because I only want to examine when ecological modernisation ideas enter into the official media. This will allow me to detect changes in how Chinese authorities view previously sensitive environmental topics, such as climate change, and whether such changes are indicative of an ecological modernisation discourse.

Lastly, I reviewed English and Chinese-based secondary source material. The bulk of discursive material for this thesis is drawn from the primary source material that I indicated in previous paragraphs of this chapter. However, the discursive material published by China's policymakers can only provide a partial picture regarding how they view environmental reform. They may wilfully or unwilfully omit information that provides a fuller illustration of how they view environmental issues. As a result, I supplement discursive material with past English-language or Chinese-language research that can better explain the degree to which ecological modernisation ideas influence China's environmental policy agenda.

Now that I have discussed the institutions that I targeted to gather the evidence for this thesis, it is crucial to explain where I sourced my material. The vast majority of the discursive material for this thesis has originated from published material in Tsinghua University's China National Knowledge Index (CNKI, 中国知网), Peking University's *Fabao Beida* (法宝北大), and, to a lesser extent, the CCP-administered People's Data (人民数据). These Chinese-language electronic databases contain a wealth of material relevant to the examination of Chinese environmental policy discourse. CNKI is administered by Tsinghua University under the aegises of the Ministry of Education, Propaganda Department of the CPC Central

[316] Chinese name is 中国人民政治协商会议.
[317] Henochowicz, Anne. 2015. "Minitrue: Clamping Down on 'Under the Dome'," China Digital Times, 3 March, https://chinadigitaltimes.net/2015/03/minitrue-clamping-dome/. Accessed 12 March 2017.

Committee, and the Ministry of Science and Technology.[318] It contains periodicals, theses, and newspaper articles published in Chinese from the level of the CCP General Secretary down to the level of a graduate student. As of April 2019, its journal database contains over 8,548 journal titles and 54,186,335 journal articles dating back to 1915. The bulk of publicly available policy discourse created by officials across China's vast bureaucracy, whether speeches, articles or interviews, can be found in this database.

A key strength of this database is the ability to search for information based on 'subject' (主题), 'title' (篇名) 'whole text' (全文), 'keywords' (关键词), 'abstract' (摘要), 'work unit' (单位), 'author' (作者), and 'publication' (刊名). The other advantage of the database is the function to separately search based on 'institutions' (机构), 'authors', and 'published year' (发表年度). I utilised each of these search functions using keywords related to my case studies and the above search functions in a variety of different permutations. For example, I would search on an author whom I knew was a senior environmental policymaker and add relevant keywords related to one of my case studies, such as 'cleaner production', 'circular economy' or 'green GDP'. I would also search on the position titles of senior policymakers already identified, in order to uncover other relevant policymakers.

I limited my CNKI searches to the more prominent journals. Chinese academics in interviews introduced me to many of the journals in which senior government officials publish their work beyond key Party journals, such as *Seeking Truth* or *Party Construction*. For instance, ministerial and research institute periodicals such as *Environmental Protection*, *Environmental Management, Environmental Science and Trends, China Population, Resources and Environment, Macroeconomics, Energy of China,* among others, provided much of the discursive material for this thesis. The strength of these 'official publications' (刊物机关) is that environmental policymakers often publish their opinions on future policy directions in these journals. For example, if a respected Party journal such as *Seeking Truth*, publishes an article that argues for the implementation of policies that epitomise ecological modernisation views, then this reveals the importance either of the official or the policy in question. Moreover, if the Ministry of Ecological Environment (and its bureaucratic predecessors) authorise an article on environmental reform measures and ecological

[318] Chinese name for Ministry of Education is 教育部. Chinese name for Ministry of Science and Technology is 科学技术部.

modernisation in its flagship journal *Environmental Protection*, then this suggests that it approves of such reforms. This does not suggest that senior-level officials act as editors, but rather that the editorial staff of these journals would not publish ideas that contradict the stated aims of their bureaucratic masters.[319] A limitation of this database is that some sensitive and controversial policy discussions are kept within 'internal reference material' (内部参考资料) channels for officials above a certain bureaucratic rank.[320]

The other primary databases I used were Peking University's *Fabao Beida* and People's Data database of the *People's Daily* (人民日报). I used the former database to uncover new Chinese legislation, changes to China's constitution, and government policies and regulations. It archives an abundance of official documents from the Party and the Chinese government. Its search functionality is more limited than CNKI, but it allows searches based on 'bureaucratic rank' (级别) and the 'department' (部门), and states whether it is a Party or government organ that issued the official document. It also allows users to search within its database for documents ranging from the level of the Central Committee down to the level of a government bureau. It also stores Chinese legislation passed by the NPC. A further strength is that it allowed me to see whether and how elements of ecological modernisation were becoming institutionalised within Chinese legislation. Additionally, I used the People's Data database because of its archive of the *People's Daily* (人民日报) articles that date back to 1949. Its search function is the most limited out of the three, but it allowed me to see when ecological modernisation ideas entered in the public media discourse. Navigating these databases and determining the authority of certain sources requires a Sinological understanding of Chinese policymaking.

There have been some limitations concerning my research's methodology. Marteen Hajer identifies 'sites of argumentation' as an element of discourse analysis, noting that researchers should 'search for data not simply to reconstruct the arguments used but to account for the argumentative exchange'.[321] In examining China's policy discourse, isolating these sites of

[319] Interview with Remin University professor, Beijing, 12 September 2012.
[320] Interview with National Development Reform Commission policy researcher, Beijing, 23 August 2012.
[321] Hajer 2006, 73.

argumentation is more difficult than for Western discourse. As China energy analyst Erica Downs notes:

> Policy debates in China are different from those in the West. They are often hidden, and the participants frequently do not acknowledge that differences of opinion exist…This lack of dialogue between the stakeholders comes from the Chinese Communist practice of not directly citing and challenging the arguments of one's opponents and to the bureaucratic tradition of "stove-piping"'.[322]

Downs drew her argument from the energy sector, but it can equally be applied to environmental policy. Policy disagreements over environmental reforms are akin to 'a series of "competitive campaigns" whereby competing institutions promote their preferred policy solutions' but they 'generally do not acknowledge the existence of alternative viewpoints, let alone explain why their policies are better than those proposed by their opponents'.[323] Therefore, when I analysed the policy discourse noted earlier, I sought incongruencies in the statements of particular officials having regard to statements that they had made in the past.

Hajer also identifies *interviews* as a critical element of discourse analysis.[324] The lack of interviews with key policymakers presents as a methodological limitation, albeit less important in the case of my research due to its focus on the published discourse of Chinese policy officials. I was unable to supplement my document analysis with semi-structured interviews with government officials as Hajer would suggest.[325] In the context of China, gaining access to key decision-makers in Beijing raises major access issues for researchers. Although some senior and respected Sinologists can gain access to senior-level government officials, PhD and early-to-mid-career researchers cannot correspondingly access those similarly-ranked officials to help answer their particular research question.[326] Many government officials are either too busy or unwilling to speak to junior researchers. There is also a distrust among policymakers of non-Chinese analysts.[327] I faced these problems when conducting my fieldwork in Beijing, China, between February and December 2012. During this time, I conducted 26 interviews with relevant Chinese and foreign stakeholders in the government, SOEs, academia, research institutes, and NGOs over a period of five months. However, except for interviews with mid-level policymakers in the National Development Reform Commission's (NDRC) Energy

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[322] Downs 2004, 29.
[323] Ibid, 30.
[324] In particular, 'helicopter interviews', 'interviews with key players', 'second visit to key actors', and 'analyse for positioning effects', see Hajer 2006.
[325] For instance, Marteen Hajer drew on interviews with Dutch government officials in his examination of ecological modernisation in the Netherlands, see Hajer 1995, 295-296.
[326] Lampton 2014, 243-257.
[327] Interview with Beijing Normal University professor, Beijing, 22 June 2012.

Research Institute and junior researchers in state-owned energy companies, many requests for interviews with government officials were either ignored or politely refused. Based on these interviews, I was only able to gain anecdotal evidence as to how some senior officials thought about particular issues – insufficient and inadequate evidence for a research project of this size. Yet this has only presented as a minor limitation ultimately because of the wealth of documents I was able to uncover through my sources mentioned above. Moreover, anecdotal evidence suggests that even if I had personally accessed Chinese policymakers, they would not have enlightened me beyond what was contained in their speeches, articles and media interviews.[328]

This thesis predominantly draws on Chinese-language policy discourse that I have sourced and translated myself. This material allows me to gain access to important policy discourse previously inaccessible to those who cannot read Chinese. This discourse is important for the study of ecological modernisation and China. If we do not have access to this translated material, then we can only examine ecological modernisation by examining outcomes, using empirical measures of economy, industry, society and environment. The Chinese-language policy discourse I have uncovered allows for an enhanced understanding of the underlying rationales and mindsets driving ecological modernisation decisions in China. It also allows for a greater awareness for how ecological modernisation discourse developed in China and who drove that development. I attempted to provide a literal translation except when the differences between Chinese and English grammar meant that I translated into the comprehensible English, while remaining faithful to the original meaning of the text.[329]

Conclusion

This chapter has outlined the research methods for this thesis. The reflective section at the start of the chapter detailed my research journey. It sketched the issues that can arise when applying EMT to an industry that differs from those which initially provided the empirical justification for the theory. However, as a result of that preliminary research, I discovered the value of the discursive aspect of EMT and explored the theoretical-conceptual bridge between ecological modernisation theorists and constructivists which provided a useful conceptual framework to explore ecological restructuring and environmental reform in China. This framework allowed me to ascertain the principles that motivate Chinese officials to undertake

[328] Interview with Australian academic, Beijing, 13 September 2012.
[329] Walker 2016.

specific environmental reform measures and helped me assess whether ecological modernisation ideas have been incorporated into China's environmental policy agenda. From that preliminary research, I also uncovered the environmental reform measures that would structure the empirical case studies of this thesis: cleaner production, circular economy, green GDP, low-carbon economy and ecological civilisation.

The rest of the chapter has described how I would operationalise ecological modernisation and answer the central questions of this thesis. It detailed the discursive indicators for ecological modernisation, showing that *Molian* EMT can inform a constructivist reading of ecological modernisation.

Finally, I have detailed how document analysis constituted the principal research method of this thesis. The relevant discursive material was located on online databases from institutions and officials linked to the CCP, PRC Government, and the NPC. The next chapter will situate these institutions in the context of China's unique political regime. It will also detail the background of China's post-Maoist economic reforms that have altered the economic rationality of Chinese institutions and officials so dramatically.

Chapter Four: Political and Economic Context of Environmental Reform

Chapter Three detailed the research methods that guided this thesis. It outlined how a document analysis of the policy discourse of Chinese officials was used to examine whether ecological modernisation ideas have shaped China's environmental policy discourse. The chapter also highlighted some of the key institutions that this research has targeted to answer the key questions of this thesis. In other words, an important factor in studying China is an appreciation of Sinology. Therefore, before studying key Chinese environmental policy measures, this chapter situates that examination within the broader political and economic setting of China. This context is a necessary historical foundation to explore China's policy elite, its government's environmental policy agenda and ecological modernisation ideas.

The first section will examine China's political landscape, emphasising that while China has changed since 1978, it still operates as a 'Marxist-Leninist authoritarian regime'. It discusses China's political system and governance, providing further context to the theoretical and methodological considerations outlined in Chapters Two and Three. The second part of this chapter examines the institutional and organisational changes that transformed a 'backward' inefficient economy into the second-largest in the world in the short period of thirty years. This discussion emphasises how the piecemeal and cumulative effect of these reforms has been an altered economic mindset within China's elites and its political, economic and societal institutions, even if the legacies of the Maoist period remain firmly embedded within some of these institutions.

The Politics of Chinese Policy Discourse

Chinese Communist Party and Party institutions. As noted in the previous chapter, the CCP is the key political institution in China. Due to the political and administrative transformations made in the late 1940s and early 1950s, the CCP was able to intertwine and embed itself into the politico-socio-economic fabric of Chinese society and its economy. Its influence in China is immense. Since the retreat of the Nationalist Government in the late 1940s to Taiwan, the CCP has had an unchallenged status as the ultimate political arbiter in China, with no legitimate opposition. China does have 'opposition' parties, but since 1953 they have been quarantined within the advisory and perfunctory Chinese People's Political Consultative Conference after it was downgraded from the primary legislature in China in favour of the

current National People's Congress (NPC). The CCP's control is so pervasive that scholars often refer to China as a 'party-state' because the Party 'commands, controls, integrates, and completely intertwines with all sectors of the state: the government (the executive), congress (the legislature), courts (the judiciary), political consultative conference, the military, mass organisations, and all other political organisations'.[330]

The control that the CCP possesses can be traced back to the relationship it had with the Soviet Union from the early 1920s. The Soviet Union, through the Comintern, had a close relationship with the CCP in its early decades, and the result was a party with Leninist – or Stalinist – organisational principles borrowed from the Soviet's governance structure.[331] Like the Communist Party of the Soviet Union, the CCP fashions itself as a vanguard organisation, with only around six per cent of Chinese citizens acting as this 'vanguard of the proletariat' (无产阶级前锋).[332] The CCP retains strict control among its membership of 88.75 million people through the Leninist organisational principle of 'democratic centralism' (民主集中制) where individual members remain subordinate to the majority decisions of the Party.[333] This deference by its members to the party line allows the CCP through its membership base to control and influence the lives of non-Party Chinese citizens from the central level down to the village level where there might be only a handful of Party members.[334]

As to analysing how the Party organs shape environmental policy discourse, it is necessary to move beyond administrative understandings of the CCP. Administrative charts can obfuscate rather than illuminate where effective power is situated within the Party.[335] In particular, an organisational chart and the Party constitution would convey that the National Party Congress – not to be confused with the National People's Congress – sits at the apex of political power in China. It would also suggest that the National Party Congress 'selects' party members for higher positions, as shown in Figure 4.1. Its 2280 delegates meet for roughly one to two weeks every five years to pick the full and alternate members of the Central Committee (202 full-time

[330] Guo 2013, 131-32.
[331] Grasso, Corrin and Kort 2015, 81-85; Walder 2015.
[332] Saich 2004, 113; Guo 2013, 8.
[333] Saich 2004, 91.
[334] Ibid.
[335] Ibid; Li 2014.

members, 172 alternate members in 2017). The National Party Congress's quinquennial summits determine significant policy shifts in China. Many reforms that have influenced China's economic and environmental policy have originated in the macro policy guidelines (方针) announced by China's leaders at these quinquennial Party congresses. The next most crucial Party organ is the Central Committee which picks the more exclusive Politburo (22 members in 2017), and ultra-exclusive PSC.[336]

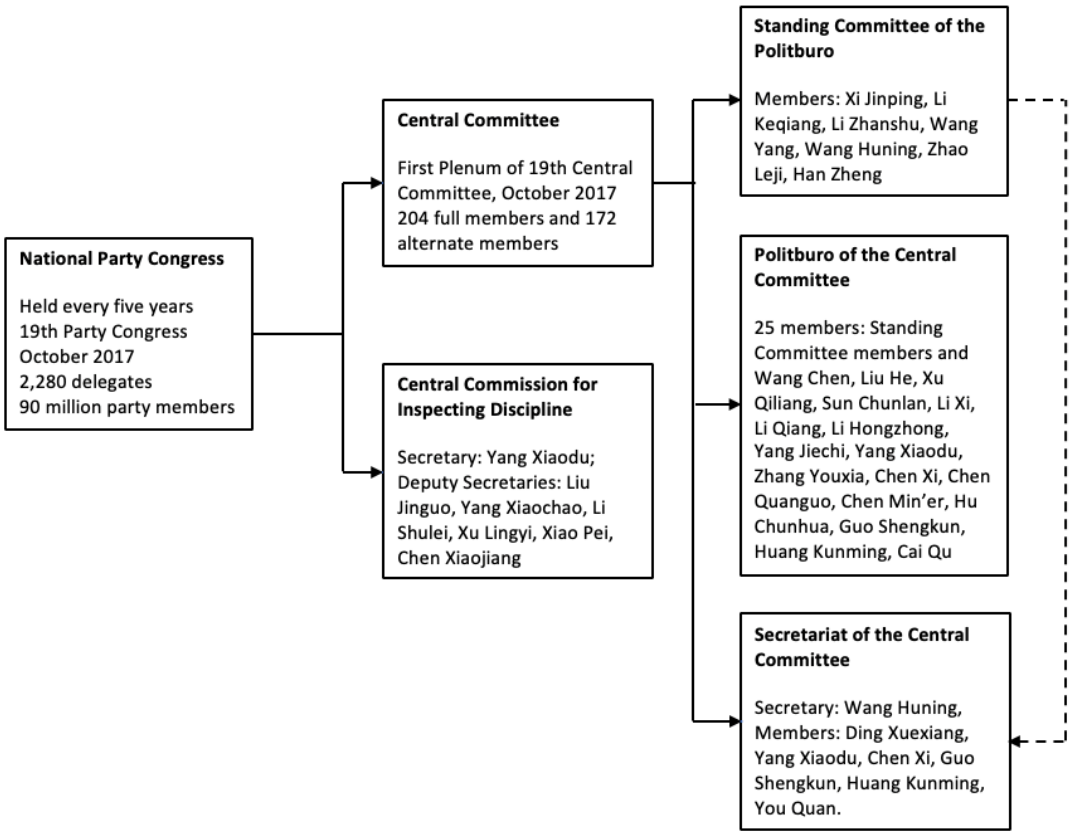

Figure 4.1 Central Organisation of the CCP (Simplified), 2017[337]

It is the latter of these institutions, the PSC, that is indeed the most powerful political organisation in China. The PSC now consists of seven members led by a 'paramount

[336] Li, Cheng. 2017. "China's new Politburo and Politburo Standing Committee," Brookings, https://www.brookings.edu/ interactives/chinas-new-politburo-standing-committee/. Accessed 22 July 2019; Bo, Zhiyue. 2017. "The 7 Men Who Will Run China," The Diplomat, 25 October, https://thediplomat.com/2017/10/ the-7-men-who-will-run-china/. Accessed 22 July 2019.
[337] Adapted from Saich 2004, 98, using various contemporary sources.

individual' (最高领导人) who, in recent years, has held the leadership positions of CCP General Secretary and Chinese President – this paramount leader represents a '*primus inter pares'* (first among equals) position in relation to the other PSC members. The PSC meets roughly every week, and it is said to be a forum of frank policy exchange.[338] Unlike other high-level official conferences and meetings, the state media does not report the ideas discussed at these meetings. As a result, much Sinology is consumed with deducing the outcomes of such meetings, given their importance for national and international policy. Party votes, such as electing CCP members to the Central Committee and PSC, are made within the upper echelons of the Party by PSC and Politburo officials and are then conveyed to the National Party Congress delegates who vote accordingly. These senior political leaders also shape environmental policy discourse in China.

State Council and government institutions. Despite the prominent role of the CCP, it is government organisations, rather than Party organs, that the PRC Constitution tasks with enacting economic and environmental policy through the State Council and its ministries, commissions and other institutions of lesser bureaucratic rank. The State Council operates as the 'executive branch of the central government in China'.[339] It consists of the Premier, vice-premiers, state councillors, Secretary-General and ministers from the various ministries in China.[340] While it does not have a legislative function, it can formulate policy, especially concerning economic and environmental matters. As political scientist Tony Saich explains, the State Council:

> can submit proposals on laws to the NPC or its Standing Committee as well as formulate administrative measures in accordance with the laws; to exert leadership over the non-central levels of administration as well as the ministries and commissions; to draw up and put into effect the national economic plan and state budget; and to oversee public order and safeguard the rights of citizens.[341]

The State Council communicates policy signals to the various ministries who then enact that policy. It does this through releasing 'documents' that communicate policy positions with varying degrees of policy importance: e.g. 'orders' (命令), 'replies' (批复), 'notifications' (通知), 'reports' (报告), 'opinions' (意见) and 'announcements' (公报).[342] Since 1978, the State Council's policy pronouncements have increasingly provided broad policy guidance for

[338] Lieberthal 2004, 175.
[339] Guo 2013, 138.
[340] Xu and Weller 2016, 2-6.
[341] Saich 2004, 133.
[342] McElwee 2011, 78.

matters of environmental protection. This point will be highlighted throughout the data chapters of this thesis. Through ministries, commissions and other bureaucratic agencies, the State Council regulates, administers and assists in the areas within the relevant policy portfolios, including economic reform, health, defence, education, foreign affairs and civil affairs. Chapter Three outlined some of the government organisations that play a vital role in shaping China's environmental and economic policy.

However, as is evident from the nature of the party-state, the CCP guides the policy direction of the government. The Party does this through various mechanisms: dual appointments, the 'nomenklatura system' and Party groups. In recent years, nearly all the senior positions within the State Council and its ministries and commissions have been held by CCP members. Senior government officials who decide not to 'join the Party' (入党) are very rare.[343] Therefore, government officials operate with 'dual lines of authority', i.e. they are responsible to the Party as well as the institution in which they work. For example, Xie Zhenhua 解振华, the NDRC's vice-chairman and lead Chinese climate change negotiator for the United Nations Framework Convention on Climate Change, has been a member off and on of the Central Committee since the late 1970s, including stints in the Central Commission for Discipline Inspection.[344] Moreover, soon after Li Ganjie 李干杰 was promoted to a ministerial position in the Ministry of Environmental Protection (MEP), he was also elected to the 19th Central Committee of the CCP. Typically, once an official is promoted to the Politburo, they are transferred out of their government position, reflecting the higher workload that comes with their new Party status.[345] This phenomenon results in government policy that is intertwined and subordinate to the policy motives of the Party. Party and government cannot be separated in practice, as the term 'party-state' suggests.

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[343] The saturation of CCP members within the State Council was not always the case. For example, when Mao and senior Party officials sought consensus in the early years of the PRC with the 'common program' era (1949–1953), they allowed four non-CCP officials as vice premiers, see Grasso, Corrin and Kort 2015, 133. Today, all but one member of the State Council is a CCP member: Minister for Science and Technology Wan Gang 万钢 who is a member of the China Public Interest Party (中国致公党), see China Vitae. 2019. "Biography of Wan Gang," http://www.chinavitae.com/biography/Wan_Gang. Accessed 23 June 2019.
[344] Chinese name is 中央纪律检查委员会.
[345] Zhonghua renmin gongheguo shengtai huanjing bu. 2019. "Li Ganjie: geren jianli" (Li Ganjie: resume), http://m.mee.gov.cn/zjhb/ldzc/liganjie/. Accessed 16 June 2019.

Second, government institutions also have 'Party groups' (党务小组), where officials hold meetings regarding Party affairs. Administratively, these groups help ensure that government departments operate according to fundamental Party principles.[346] The CCP also retains its control over ministries within the government through its powerful Organisation Department of the CCP.[347] This Central Committee Party organ assigns Party appointments to positions in the government through what is known as the 'nomenklatura' system. This system is 'a list containing those leading officials directly appointed by the Party as well as those officials about whom recommendations for appointment, release or transfer may be made by other bodies, but which require the Party's approval'.[348] There was a period during the 1980s when influential liberal reformers believed that the Party should devolve some of its control to government agencies. Led by Deng Xiaoping and then PRC Premier and CCP General Secretary Zhao Ziyang 赵紫阳, these reformers reduced the role of the Party and the Organisation Department in the day-to-day operations of the government through 'separating the functions of the party from the government' (党政分开).[349] Deng stated in the early 1980s:

> it is time for us to distinguish between the responsibilities of the Party and those of the government and to stop substituting the former for the latter. This will help strengthen and improve the united leadership of the Central Committee, facilitate the establishment of an effective work system at various levels of the government from top to bottom, and promote a better exercise of government functions and powers.[350]

Deng's plan was that the CCP would still retain control over macro-level decision making and manage ministerial-level cadres, but the Party would devolve its power over government appointees, government decision making and the everyday operations of government. With his backing, Zhao started to reduce the number of 'party groups' (党组) in many government departments after the 13th Party Congress in 1987.[351] The Ministry of Personnel also took many functions previously handled by the Organisation Department with the aim that the Central Committee would handle 'top civil servants' – just a small fraction of total cadres.[352] Party departments that served 'similar [administrative] functions as those in the state sector were to be abolished'.[353] However, the events of Tiananmen in 1989 stymied liberal efforts to

[346] Guo 2013, 157; Shirk 1992, 64.
[347] Chinese name is 中国共产党中央组织部. See Chapter Three in McGregor 2010.
[348] Brødsgaard 2009, 104.
[349] Zheng 1999, 1164.
[350] Quoted in ibid, 1163.
[351] Burns 1994, 461-464.
[352] Ibid, 463.
[353] Saich 2004, 114.

separate the Party from the day-to-day function of the government. Zhao Ziyang was placed under house arrest in May 1989, due to his perceived inaction in curbing the then month-long protests, and a year later the Organisation Department expanded the nomenklatura to include universities (a source of liberal foment).[354]

It is within this context that the State Council and the ministries beneath it remain inseparable from the Party. The present context represents a change from the early years of the PRC when Mao Zedong had adopted a 'bipartisan' approach to governance with other parties of the 'United Front' as China emerged from its disastrous civil war.[355] In the context of economic and environmental policy, the strengthened nomenklatura system means that while senior-level officials within the government may deliver speeches and publish articles that reflect their particular bias on specific policy issues, their opinions represent in a broad way the views of the Party. To return to the Leninist organisation principle of democratic centralism, senior government officials will not openly disagree with the core Party policy positions. Disagreement only occurs when key policy positions are unsettled or in flux. These points are crucial in light of how researchers understand the significance of pronouncements coming from Chinese officials, and this has been reflected in the evidence gathered and used in this thesis concerning the influence of ecological modernisation ideas on environmental policy discourse.[356] Environmental policy statements by government officials reflect the general policy direction of the CCP.

Another important factor to consider with regard to the policy statements of Chinese officials is Deng's decision to retire many Party cadres in the 1980s. His decision led to an increasingly 'professional' government workforce in China. In the 1980s, China suffered from a dearth of specialised government officials (and state-owned enterprise managers) to help guide China's economic growth and liberalisation, as many of the officials previously in charge had been appointed purely on the basis of their party loyalty. Many officials had also had their

[354] Burns 1994, 464.
[355] The United Front was a coalition of parties the Chinese Communist Party partnered with to overthrow the Nationalists: Jiusan Society, China Democratic League, China National Democratic Construction Association, China Association for Promoting Democracy, Chinese Peasants' and Workers' Democratic Party, Revolutionary Committee of the Chinese Kuomintang, China Zhi Gong Party, and Taiwan Democratic Self-Government League.
[356] See Chapter Three.

schooling interrupted by the Cultural Revolution (1966–1976). Deng sought to change this recruitment norm with the introduction of the 'cadre four modernisations' (干部四化). This guiding principle included three new indicators – age, education, and speciality – that would form the basis for party-state cadre promotion beyond revolutionary credentials.[357] The legacy of Deng's policy is evident in the curricula vitae of current government ministers and vice-ministers related to environmental and economic policy. Many senior officials within PRC ministries have a bachelor education, typically in economics or engineering. Two such examples are current MEP Minister Li Ganjie, and the present chairman of the NDRC, He Lifeng 何立峰. Li studied nuclear engineering at Tsinghua University, while He graduated with a finance and economics degree from Xiamen University.[358] Other officials have backgrounds in journalism or law. For instance, the former vice-minister of the MEP Pan Yue 潘岳 was a cadet in the *Economic Daily* and Xie Zhenhua, who was mentioned earlier, studied environmental law at Wuhan University.[359] These educational profiles illustrate that China's leading government officials are not merely communist ideologues who slavishly adhere to Marxists doctrines. China's modernisation drive since the 1980s has encouraged the government to employ officials who specialise in their portfolios. In other words, these reforms mean that the policy discourse of China's new 'technocratic elite' is influenced more by varied educational experiences than Marxist theory.[360]

National People's Congress. The other state organ that is relevant for this study of environmental policy discourse is the NPC, which functions as China's primary legislature.[361] The laws passed by the NPC govern how the economy and the environmental sector work. Chapter Two documented the various environmental legislation that Chinese authorities

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[357] Guo 2013, 307.
[358] Zhonghua renmin gongheguo shengtai huanjing bu. 2019. "Li Ganjie: geren jianli" (Li Ganjie: resume), http://m.mee.gov.cn/zjhb/ldzc/liganjie/. Accessed 16 June 2019; Zhonghua renmin gongheguo guojia fazhan he gaige weiyuanhui. 2019. "He Lifeng: geren lianli" (He Lifeng: resume), http://helifeng.ndrc.gov.cn/grjl/. Accessed 16 June 2019.
[359] Souhu xinwen. 2016. "Panyue ren zhongyang shehui zhuyi xueyuan dangzu shuji, di yi fu yuan zhang" (Pan Yue to serve as Party Secretary and First Vice President of the Central Institute of Socialism), 3 April, http://news.sohu.com/20160304/n439369797.shtml. Accessed 16 June 2019; Renmin wang. 2002. "Xie Zhenhua tongzhi jianli" (Xie Zhenhua's resume), http://www.people.com.cn/GB/shizheng/252/9667/9683/20021128/876285.html. Accessed 16 June 2019.
[360] Saich 2004, 36-37.
[361] Ibid, 125-133; Ching.org.cn. no date. "National People's Congress," http://www.china.org.cn/english/27743.htm. Accessed 23 June 2019.

enacted from the 1980s onwards. Like other state institutions, it is essential to note the central role of the CCP with respect to the NPC. Not all of its 2987 delegates, who meet once a year, are CCP members, but about 72 per cent are. The other delegates are drawn from China's 'united front' parties which formed an alliance with the CCP against the old Nationalist Government regime before the 1949 Revolution.[362] The NPC is often disparagingly labelled a 'rubber stamp' parliament and its delegate positions considered 'ceremonial rather than substantial', since the Party elite already predetermine many of its votes.[363] The NPC passes all proposed legislation prior to voting in the Great Hall of the People, even if some delegates have eschewed the principle of democratic centralism for some controversial legislation.[364]

Furthermore, the NPC – through its various 'special committees' (专门委员会) – also scrutinises draft legislation before these proposed laws go to a vote in the NPC, providing technical comments and advice for further drafts. The NPC has reviewed environmentally-based legislation since 1993 through its Environment and Resource Protection Committee.[365] Many members of this committee once held senior-level positions in the Central Committee, usually with provincial leadership experience or government backgrounds in engineering or heavy industry. Some have a government background in the environment, while others have progressed through party organs. For example, the former chair of the NPC's Environment and Resource Protection Special Committee Qu Geping 曲格平 – a man dubbed by Chinese media as the 'father of Chinese environmentalism' (环保之父) – was a former environmental bureaucrat whose political patron was former Premier Zhou Enlai. He was the inaugural chairman of the State Environmental Protection Bureau (SEPB) and was a member of the NPC's standing committee for two national congresses during the 1990s.[366] Moreover, the present head of the NPC's environmental-focused committee is Lu Hao 陆浩. Chemistry-

[362] Saich 2004, 125-133.
[363] Ibid, 129; Guo 2013, 159.
[364] For example, the construction of the Three Gorges Dam near Yichang. Around one-third of NPC delegates either abstained or voted against approving the Three Gorges Dam, see 1999. "Questioning Three Gorges Dam," New York Times, 29 March, https://www.nytimes.com/1999/03/29/opinion/questioning-three-gorges-dam.html. Accessed 23 June 2018.
[365] Chinese name is 全国人民代表大会环境与资源保护委员会.
[366] Zhao Ti. 2005. "Qu Geping: Zhongguo 'huanbao zhi fu'" (Qu Geping: China's father of environmental protection), Renmin wang, http://www.people.com.cn/GB/14576/33320/33325/33789/3275985.html. Accessed 23 June 2018.

trained, he rose primarily through party channels to his position within the Central Committee in the last three National Party Congresses, as well as retaining his present position in the NPC.[367]

Nearly all members of these committees are Party members, and the chairman always has been a member of the CCP. As far as understanding the questions raised in Chapters Two and Three concerning environmental policy discourse, this complex administrative decision-making process means that in order to gather evidence concerning whether Chinese officials have incorporated ecological modernisation ideas into China's environmental policy discourse, it is important to take claims from a range of government and Party spokespersons seriously. All public statements from government officials signify to a large extent the Party's policy position. Yet it is vital to recognise that China's senior government and legislative officials are increasingly acquiring expertise concerning economic and environmental policy solutions, and this means that there is always the possibility that social and scientific debates within the party are reflected in differing public statements.

'Fragmented governance' and environmental policy discourse. Regardless of the influential role that the CCP retains over the state and government organs, scholars have detailed how political authority below the level of the Politburo can exhibit 'disjointedness' whereby lines of authority are not clear-cut, resulting in a 'fragmented' political system (see Chapter Two).[368] The disjointed nature of Chinese governance has implications for how researchers study government decision-making, including economic and environmental policy. Rather than a purely authoritarian system whereby the top leadership has control over all government decision-making, government organs, especially within the economic sphere, operate within what political scientists Kenneth Lieberthal and Michel Oksenberg conceptualise as 'bureaucratic fragmented authoritarianism'.[369] In particular, bureaucratic institutions of equal status cannot unilaterally direct their counterparts to implement measures in the absence of guidance from more senior-level politicians. Political leaders may choose to

[367] Renmin wang. No date. "Lu Hao tongzhi jianli" (Comrade Lu Hao's resume), http://politics.people.com.cn/GB/shizheng/252/9667/9684/6569692.html. Accessed 23 June 2019.
[368] Lieberthal 1992, 8.
[369] Lieberthal and Oksenberg 1988.

stay out of a policy disagreement 'because they lack the knowledge to decide, they do not care, their resources are insufficient to enforce a decree, or the leadership is itself divided'.[370] Therefore, bureaucratic stakeholders, such as ministries, resort to a range of 'bargaining' measures to elicit agreement from their counterparts. This type of bargaining can focus on such governance issues as 'revenue sources, budgets, personnel, organisational jurisdictions, market shares, production rights, subsidy levels, investment allocations, and jobs'.[371] The Chinese government has resorted to supra-cabinet-like groups, called 'leading small groups' or 'committees', to overcome this fragmentation and ensure that China's bureaucratic organs act in policy unison (see Chapter Three for the leading small groups and committees related to environmental policy).

Role of factions. Before this chapter shifts its focus to the economic reforms that have altered the economic rationality of China's policymakers, it is essential to note that while China has experienced a reduction of personalised leadership (or 'the rule of man'), and a gradual bureaucratic institutionalisation of politics and governance, it still experiences what scholars have labelled 'informal politics' or 'factionalism'.[372] In addition, while China has institutionalised term limits[373] and retirement ages, the 'factional' (宗派) aspect of elite Chinese politics can render its study more akin to 'tasseography' as researchers seek to examine policy changes on the perceived motives and assumed members of each faction.

Factions in China can centre to some degree around policy and ideology, but more typically they coalesce around opaque and complex networks termed '*guanxi*' ('relationships', 关系). US scholar Xuezhi Guo explains that '*guanxi* has been embodied in the behaviour of the Party elite since the early days of the CCP and has become a significant part of the organisational culture'.[374] *Guanxi* networks can develop through shared history derived from 'family

[370] Lieberthal 1992, 34.
[371] Lampton 1992, 44.
[372] Dittmer and Wu 1995; Tsou 1995; Saich 2004.
[373] However, in March 2018, the National People's Congress removed presidential term limits in China which have the potential to allow Xi Jinping (or future successors) to rule China 'indefinitely', see Doubek, James. 2018. "China Removes Presidential Term Limits, Enabling Xi Jinping To Rule Indefinitely," NPR, 11 March, https://www.npr.org/sections/thetwo-way/2018/03/11/592694991/china-removes-presidential-term-limits-enabling-xi-jinping-to-rule-indefinitely. Accessed 22 June 2019.
[374] Guo 2001, 70.

relationships, native place, school ties, military unit, or networks of shared friends'.[375] The Western conceptual equivalent for guanxi would be the 'old-boys network'. Owing to the deep socio-cultural origins of this concept, *guanxi* in China, especially within China's elite politics, exhibits multiple interwoven facets, or 'dimensions', each with varying degrees of 'instrumentality' or 'emotion'.[376] On the one hand, some guanxi networks base themselves merely on the exchange of 'material obligations' and are purely an 'exchange relationship'. On the other hand, some relationships derive their bond from norms such as etiquette and morals, usually through respect and deference towards a political patron or military commander. The importance of the latter is highlighted by the example of Chairman Mao reshuffling regional military commanders after former Defence Minister Lin Biao's 林彪 plane crash during his flight to the Soviet Union in 1971. Mao wanted to separate military leaders and their subordinates as he feared that the leaders inspired enough respect to mount a coup.[377]

Factions still shape contemporary Chinese politics and this needs to be considered in any discussion of environmental policy. In other words, researchers cannot divorce policy shifts and reforms from an understanding of factional disputes. In recent years, the notable factions have been the 'Youth League Faction' (团派) and the 'Shanghai Clique' (上海帮). The former faction is drawn from former Chinese Communist Youth League members and headed by former CCP General Secretary and Chinese President Hu Jintao 胡锦涛. The latter group is comprised of former officials from Shanghai and led by Jiang Zemin 江泽民 (also a former CCP General Secretary and Chinese President).[378] The relevance of these factions for environmental policy can be seen in the discussion among scholars in recent years of the existence of a 'petroleum faction' (石油帮) led by now-jailed former PSC member and China National Petroleum Corporation General Manager Zhou Yongkang 周永康.[379] The discussion of factions remains taboo in China and the CCP does not typically acknowledge their existence, but researchers need to be conscious of the possibility of their informal influence on policy discourse, including environmental policy.[380]

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[375] Joseph 2014, 20.
[376] Guo 2001, 70-72.
[377] Ibid, 71.
[378] Lam, Willy Wo-Lap. 2016. "The Eclipse of the Communist Youth League and the Rise of the Zhejiang Clique," Jamestown Foundation, 11 May, https://jamestown.org/program/the-eclipse-of-the-communist-youth-league-and-the-rise-of-the-zhejiang-clique/. Accessed 23 June 2019.
[379] Downs 2008.
[380] Ibid; Pye 1995.

The Evolution of China's Economic Rationality: Economic Reform in China (1979–the present)

This political and policymaking background for exploring environmental policy discourse in China provides the context to the economic reforms that transformed China from a Maoist communist state to one that embraces market forces under a version of socialism labelled a 'socialist market economy'. It is necessary to detail this context because China's environmental policy discourse has coexisted and evolved in conjunction with these economic reforms. Moreover, as outlined in Chapters One and Two, it was these economic reforms that placed increased stress on the environment. Therefore, it is vital to specify and explain the 'economic rationality', or economic mindset, of China's politicians and government officials as economic considerations are fundamental importance to ecological modernisation (see Chapter Two).

During the early years of the post-Mao era, China's politicians adjusted their economic rationality away from one that previously operated according to socialist principles. Maximum production had been the driving economic force under Mao Zedong with little regard for efficiency. However, as already noted in Chapter One, the Third Plenum of the 11th Central Committee in 1978 provided a turning point for the future economic reorientation of China through the announcement of the policy of 'reform and opening up'. Dissatisfied with the relative poverty that had gripped the country for nearly three decades, China's political leaders, led by Deng Xiaoping decided that future economic development should embrace market forces, and this meant a diversion from Maoist socialism. Primarily because of Deng's political imprimatur, the CCP only tentatively and gradually embraced market forces with the aim to enhance economic productivity and raise the livelihood of the Chinese people.[381] Another critical moment occurred in 1982 when the Party altered its Constitution to reflect a shift in its core focus to economic production and development rather than 'class struggle' (阶级斗争). This new 'non-ideological' goal represented a significant change for Chinese politics as class struggle had overwhelmingly characterised the Maoist era. Under Mao, many Party officials who strayed from the fundamental tenets of class-struggle socialism had been labelled

[381] See Chapter 10 in Grasso, Corrin, and Kort 2015; Vogel 2011, 243.

'capitalist roaders' (走资派) and purged, as Deng Xiaoping experienced in 1968.[382] However, in this new post-Maoist epoch, ideology would no longer trump pragmatic economic policies.

The political decisions made at that 1978 Third Plenum and the 1982 constitutional changes soon gained momentum as Chinese authorities embarked upon an experimental, cautious and gradual reform strategy commonly referred to as 'crossing the river feeling for stones' (摸着石头过).[383] This gradual strategy over the next decade or so would stand in stark contrast to the 'big bang' approach which marked the Eastern European post-Soviet reform experience.[384] The result of the Chinese reforms was that in just under two decades the CCP no longer presided over a collectivised workforce and centrally-planned economy where bureaucrats in Beijing allocated resources and set production quotas (even if it still titularly refers to itself as a 'communist' 共产 party). This new economic mindset appears to have paid dividends for China's politicians. China's economy flourished under these new arrangements as reported extensively in the global media.[385] While foreign analysts perennially predict 'bear market' conditions for China, its 'bullish' economy has averaged nearly 10 per cent annual economic growth for nearly four decades since 'reform and opening up', to become the second largest economy in the world.[386] It has a modern economic enterprise system with stock markets and corporate governance that, while unique to China's political and historical circumstances, has created some of the most economically powerful corporations routinely appearing within *Forbes Global 500 List*.[387]

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[382] Guo 2013, 79; Vogel 2011, 43.
[383] Naughton 2007.
[384] McMillan and Naughton, 1992; Wei 1997. The 'big bang approach' is a term used to characterise rapid economic reform of planned economies. The big bang approach resulted in the deregulation of prices and wage, the privatisation of state-owned companies, an independent central bank, the privatisation of state banks, fiscal policy that balanced the budget, free trade, and a flexible convertible exchange rate, see Sachs 1993.
[385] Eisenmen, Joshua. 2018. "What we really know about China's Reform and Opening Up," Washington Post, 15 November, https://www.washingtonpost.com/news/monkey-cage/wp/2018/11/15/what-we-really-know-about-chinas-reform-and-opening-up/?noredirect=on. Accessed 21 January 2019; Zhou, Christina and Bang Xiao. 2018. "China's 40 years of economic reform that opened the country up and turned it into a superpower," ABC News, 2 December, https://www.abc.net.au/news/2018-12-01/40-years-of-reform-that-transformed-china-into-a-superpower/10573468. Accessed 21 January 2019.
[386] Ibid. See also Cheng, Evelyn. 2019. "China may slip back into its old habits as growth slows. That could raise debt levels again," CNBC Markets, 16 July, https://www.cnbc.com/2019/07/17/china-slowdown-could-prompt-measures-leading-to-high-debt-analysts-say.html. Accessed August 1 2019.
[387] Fortune. 2019. "Fortune Global 500," https://fortune.com/global500/2019/. Accessed 23 June 2019.

An appreciation of this economic transformation in China demands a reflection on the first phase of reforms that occurred in the late 1970s and early 1980s. The economic history of post-Maoist China shows the remarkable shift that took place within the economic ethos of China's policymaking elite. With the new reforms, the government ratcheted down government restrictions on agricultural producers to allow farmers to accumulate surpluses once again. In the 1950s, Mao had nationalised agrarian land and collectivised workers into state communes, of which there were around 50,000 by the late 1970s.[388] Under Mao, all produce from nationalised agriculture was transferred to state warehouses. This generated no incentive for farmers to boost productivity through increasing labour inputs or adopting innovative agricultural methods.

However, after China's 1978 economic reform, a 'rogue' provincial pilot study in Sichuan opened the way for farmers to enter into supply contracts with the state, known as the 'household responsibility system' (家庭联产承包责任制).[389] While phrased in vague Communist Party terminology, this measure represented a significant shift in Chinese economic policy because it no longer constrained independent economic initiative for China's hundreds of millions of farmers. Agricultural producers would still have to supply a certain quota of grain to the state, but any surplus harvest above that quota could then be sold at market prices. These policies were a boon for the Chinese government and farmers as agricultural production rates markedly increased each year up to 1987. In response to the early achievements of the policy, the NPC in 1982 formally abolished the 50,000 communes throughout China, bringing to a close Mao's dreams of a collectivised and communist China.[390]

It was the success of these measures that provided Chinese authorities with the confidence to focus their attention on allowing market-orientated public and private economic entities in other sectors of the economy to enter and then 'outgrow' the planned economy.[391] The 1982 decision by the NPC to formally abolish communes helped not only the agricultural sector, but also associated communal workshops and stores that were converted into 'semi-socialist'

[388] Grasso, Corrin and Kort 2015, 223.
[389] Naughton 1995.
[390] Grasso, Corrin and Kort 2015, 223.
[391] Naughton 1995.

township village enterprises (TVEs) owned by local governments.[392] Free from the restrictions of central planners in Beijing, these TVEs now had the autonomy to produce goods for whatever locality in China they wanted and the flexibility to operate according to consumer demand.[393] Some of these former communes embarked on manufacturing, while others remained in primary industries, such as coal mining.[394] Typically, the operational choices these TVEs made were based on the equipment they inherited.[395] Chinese authorities, led by Deng, were surprised by the emergence and the subsequent success of TVEs, but in keeping with Deng's pragmatic philosophy they decided to allow these markets 'to expand as long as they did not interfere with [state] plans'.[396] TVEs contributed significantly to early economic success in China, and from 1978 onwards the TVE contribution to overall industrial output grew from 9 per cent to 42 per cent just sixteen years later.[397]

The reforms discussed above demonstrate how China's reform politicians were fostering a new economic rationality based on market forces in the agricultural sector and former socialist brigades. Around the same time as these reforms, Chinese authorities were also permitting private entrepreneurs, known then as 'individual household enterprises' (个体户), to operate in China's emerging market economy.[398] The government could have shut down what Mao would have considered a bourgeois influence, but they instead allowed private entrepreneurs to gain a stronger foothold in China's economy. These new economic actors filled the void for what had been, up until market reforms, a repressed demand for goods and services (such as restaurants and repair shops). Like TVEs (and township village mines), they also absorbed many surplus workers after the abolition of the rural communes, keeping 'unemployment' (待业) at manageable levels and social unrest at a minimum. Many of these private entrepreneurs took advantage of foreign capital in special economic zones in Shenzhen 深圳, Zhuhai 珠海, Shantou 汕头, and Xiamen 厦门, which fostered export-led development. China no longer relied on an autarky (or economic 'self-reliance' 自立更生) as they had proudly boasted under Mao, and external economic actors became a more important part of the local economy.[399]

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[392] Li and Putterman 2008, 355-357.
[393] Naughton 1995, 144-158.
[394] Ibid, 160-161.
[395] Naughton 2007, 272-274.
[396] Vogel 2011, 445.
[397] Ibid, 447.
[398] Ibid, 447-449.
[399] Grasso, Corrin and Kort 2015, 225-227; Naughton, 2007, 407.

China's early SOE reforms. By the late 1980s, China's economic reforms were reshaping China's society along the lines of market principles. While Chinese authorities were attempting to facilitate the growth of the non-state sector, they also undertook parallel economic reforms within the state economic sector to reform China's under-performing state-owned enterprises (SOEs) by gradually reducing central government control over their daily operations. These reforms entrenched the notion of efficiency and profit into a new economic mindset in China's SOEs. Since the early 1950s, SOEs had underperformed economically. Even with favourable state subsidies, such as 'low-interest loans and other policy protections', over 40 per cent of SOEs in 1978 were still running at a loss.[400] This underachievement was due to a range of factors, but it occurred primarily because of the multiple functions they were required to carry out on behalf of the state. As Li and Putterman note, during the Mao era 'Chinese SOEs fulfilled the traditional role of enterprises in a command economy, being assigned responsibility for meeting specific output targets with an agreed number of employees and payroll, and with assigned allocations of both capital goods and intermediate inputs'.[401] Because they borrowed their socialist economic model from the Soviet Union, economic levers were placed firmly in the hands of government bureaucrats who, owing to their ideological predilections, typically wanted to ensure a 'cradle-to-grave welfare system' regardless of the cost.[402]

Concern surrounding the inefficiency of SOEs dates back to the late 1950s and 1960s. In the early years of the PRC, some 'outspoken Chinese economists' focused on these concerns and raised early criticism about 'the lack of efficiency endemic to SOEs'.[403] For instance, Gu Zhun 顾准, a leading intellectual who had been purged in the anti-rightist campaigns of the early 1950s, argued that state planners were too ill-equipped to involve themselves in enterprise management. He argued that markets rather than planners needed to guide SOEs, and more autonomy should be afforded to managers. Other critics raised similar concerns during this period.[404] Despite these objections, little meaningful reform materialised during the Maoist

[400] Lin, Cai and Li 1998, 425; Yu 2014, 163.
[401] Li and Putterman 2008, 357.
[402] Walder 2015, 91-94; Yu 2014, 162.
[403] Huang 2012, 98. See also Lin, Cai and Li 2003, 49.
[404] Huang 2012, 98.

period. The ideological fervour at the time meant that 'capitalist roader' ideas opposed to Maoist thought were often immediately criticised and censured.[405]

However, once China entered its post-Mao phase of economic development, the SOEs' traditional operations produced a growing budgetary burden on the state. This provided the opportunity for a new economic mindset to materialise in China. The SOEs were seen by some critics to be consuming much needed capital that the state could use to grow other parts of the economy.[406] There was a growing realisation among China's leaders that operational decisions within SOEs would have to take account of profitability and market forces if these companies were to survive and compete with TVEs and private entrepreneurs.[407] It was this hard budget reality that provided the political impetus for state-enterprise reform in China.

The early reform period (1978–1984) therefore also provided the foundation for changes to China's SOEs and a shift in their economic mindset. This period was characterised by decentralised experimentation, or what Sebastian Heilmann calls 'experience first, laws later', as entrepreneurially-minded provinces implemented policies in an *ad hoc* fashion in order to make their state enterprises more profitable. Chinese authorities also pursued a nascent reform strategy, albeit without an 'ex-ante blueprint' that was formulated in advance of these reforms, that would strike that balance between planned and market economies.[408] Any attempt to abolish the planned economy so soon after the Cultural Revolution and the Mao era using a mass privatisation 'big bang' technique of China's state-owned industries was 'simply unthinkable'.[409] Therefore, the first few years following the Third Plenum of the 11th Party Congress in 1978 witnessed a series of experimental SOE reforms that would last through to the late 1980s. The piecemeal nature of SOE reforms reflected the battle between liberals and conservatives.[410] Echoing their response to the emergence of TVEs and private entrepreneurs, conservatives tried to push back against SOE reforms. These conservatives argued that more accurate planning was the solution rather than less planning. Despite this, by 1984, reformers led by Zhao Ziyang were able to muster enough political support to forge on with reforms.[411]

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[405] Ibid.
[406] Naughton 1995.
[407] Ibid.
[408] Heilmann 2011.
[409] Naughton 1995, 99.
[410] Ibid; Heilmann 2011.
[411] See Chapter Five in Naughton 1995.

Major reforms during the 1980s focused on expanding SOE managerial autonomy and decision-making. Reforms also centred on allowing state-run companies to retain profits (known as 放权让利) and provide bonuses for their workers. Liberal reformers within China's political leadership considered these measures crucial for the ongoing viability of state-run enterprises within China's socialist modernisation. No longer would everyone within a work unit be treated the same, a situation referred to as the 'big rice pan' (大锅饭). Reformers broke with this commune ethos by allowing employees who worked longer hours to receive more remuneration than their workmates. In particular, the Chinese government shifted away from using enterprises purely as a source of budgetary revenues, through the introduction of 'profits for taxes' (利改税) whereby they would remit a stipulated amount of taxes rather than all their profits to the government.[412] Chinese authorities formalised this new managerial autonomy through the State Council's 1984 pronouncement *On Regulations of Further Expanding Autonomy of State-Owned Enterprises*. This regulation allowed managers to control wage and employment decisions, encouraging them to use profitability as an indicator to guide wages and employment. Furthermore, the introduction of 'dual-track pricing' (双轨制) in 1985 allowed managers to sell surplus production at non-planned prices. Mirroring the 'household responsibility system', managers entered into contractual arrangements with the state. In effect, they leased the factory equipment in return for providing the planned economy with subsidised goods.[413] These plans started with yearly contracts, but after the 13th Party Congress in 1987 they were translated into multi-year contracts, providing SOE managers with more stability.[414] The government initially mandated that the prices of these goods would be within 20 per cent of planned prices, but over the years that requirement was relaxed once the planned economy faded in relevance.[415]

The resurgence of a socialist economic rationality in China. These economic and enterprise reforms were politically controversial within the top echelons of China's political leadership and, for a period during the 1980s, it seemed that China might return to the economic outlook of its Maoist past. While economic reforms encouraged rapid economic growth, they also caused inflation, which exceeded 25 per cent by the late 1980s.[416] Yet, Deng and CCP

[412] Fernandez and Fernández-Stembridge 2009, 6.
[413] Naughton 1995, 138-142; Grasso, Corrin and Kort 2015, 221.
[414] Li and Putterman 2008, 358.
[415] Naughton 1995, 203.
[416] Naughton 1991, 208.

General Secretary Zhao Ziyang sought to be prudent, sensible and pragmatic. They remained steadfast in the view that China should liberalise its economy even if they were cautious about large-scale market liberalisation and privatisation. However, conservative economic planners, led by the powerful Party elder and economic tsar Chen Yun 陈云, opposed Deng's policies and advocated for more significant restrictions on TVEs because they were considered wasteful and diverted much-needed resources and labour away from SOEs.[417] Furthermore, conservatives also pointed out that the economic reforms of China's enterprises had led to an increase in corrupt officials who embraced this new profit ethos through channelling subsidised goods from the planned economy to the lucrative market economy.

It was the combination of high inflation and corruption that led to the widespread protests across China in May-June 1989, culminating in the bloodshed of June 4 in Tiananmen Square. The failure of liberals to prevent these protests provided an opportunity for the conservative faction led by Chen Yun to push through 'regressive' socialist economic policies and temporarily stymie further economic liberalisation.[418] Conservatives wanted to reinstate stronger state control by keeping the economy within a 'birdcage' (鸟笼) whereby markets would have restrictions placed upon them to ensure that the economy did not grow too fast and authorities could arrest inflation.[419] Specifically, they reasserted control over the economy through macroeconomic austerity, increased planning and preferential policies for SOEs, and reinstitution of the old 'iron rice bowl' (铁饭碗) employment system that provided 'cradle-to-grave job security' for China's hundreds of millions of state-owned workers.[420] Moreover, managers lost autonomy, authority and incentives, which had steadily grown since the early 1980s. This loss of autonomy resulted in factories being ordered to produce goods for political

[417] Reformers also had to contend with conservative opprobrium directed towards the growth of the private sector and entrepreneurs. Deng chose to engage in semantic jiggery-pokery to see off these ideological attacks. Capitalists were an anathema to socialism, but Deng argued in the early stages of private entrepreneurship that it was consistent with socialism noting that in *Das Capital* Karl Marx employed the example of the exploitative capitalist with eight employees. Therefore, if a private enterprise had no more than seven workers, and the owner worked within the business as the eighth employee, then they were not capitalists. That argument would only last for so long with China's growing economy, so when private enterprises grew beyond eight employees, Deng employed the 'duck example' reasoning to mock these attacks: 'if a farmer had three ducks and he expanded his team to five ducks was he now a socialist?', see Vogel 2011, 449. See also Naughton 1995; Perkins 1988.
[418] Naughton 1995, 22.
[419] Dittmer and Wu 1995; Naughton 1995.
[420] Fernandez and Fernansez-Stembridge 2009, 6; Brødsgaard and Gang 2014, 78.

reasons regardless of demand.[421] Apart from controlling inflation, these 'retrenchment' reforms provided little economic benefits, and the economy slowed significantly.[422] For SOE managers, the post-Tiananmen policies proved 'disastrous' as wage costs and interest payments increased rapidly with no commensurate demand for produced goods to offset these costs.[423] Moreover, although these measures reduced inflation, this outcome was partly attributable to reduced economic growth.[424]

The political credentials of the conservatives were tarnished by the sluggish economic response to their policy measures, which revealed that there could be no restrengthening of state planning and a return to the socialist economic rationality of the past. To provide a renewed impetus for the resumption of market reforms, Deng Xiaoping embarked on a clandestine 'Southern Tour' (南巡) of China's southern special economic zones during 1992 without informing his conservative colleagues. Through his skilful use of state media to highlight the past success of special economic zones, Deng was able to garner the required political attention to reinstate the imperative of reform. This was carried on by Jiang Zemin once Deng stepped away from the political limelight.[425] The Southern Tour marked an important juncture in China's recent economic history. Afterwards, as John Wong phrased it, 'the direction was clear to all: no quitters, no doubters, and above all, no going back'.[426] The results of Deng's efforts and accompanying political manoeuvrings were successful; in November 1993, the Third Plenum of the 14th Party Congress, led by Jiang Zemin, finally endorsed the shift from a 'socialist commodity economy' (社会主义商品经济) to a 'socialist market economy' (社会主义市场经济). The nomenclature for China's SOEs was altered from China's 'state-run enterprises' (国营企业) to 'state-owned enterprises' (国有企业), reflecting the new economic rationality in China.[427] Put simply, China's politicians had discarded one of

[421] Chapter Eight in Naughton 1995.
[422] Ibid.
[423] Ibid, 280.
[424] Ibid, 279-283.
[425] Chapter 23 in Vogel 2011.
[426] Wong 2010, 69.
[427] A year later, the NPC also passed the 1994 Company Law, providing a blueprint for the evolution of China's 'modern enterprise system' (现代企业制度) and the corporatisation that would transform China's state-owned economy, and 'separate the government from enterprises' (政企分开), see Huang and Zheng 2014.

the major economic vestiges of its Maoist past. They now acknowledged that future development would be based primarily on capitalist economic levers.

These economic reforms also influenced the ideological and membership bases of the CCP. A decade later, at the 16th Party Congress in 2002, after China had experienced extraordinary economic growth, the CCP approved what would have been unthinkable in the Maoist era: the Party would 'allow' private entrepreneurs to 'join the party'. Jiang Zemin's 'Three Represents' (三个代表) helped provide the ideological justification for the admittance of 'Red Capitalists' into the Party[428], on the grounds that the Party had refashioned itself to represent the 'most advanced scientific and productive forces and a broader constituency than the traditional working class'.[429] The nature of the 'vanguard' had diversified. The CCP no longer saw market competition, private capital and profit as taboo. To return to the analogy of China's economic tsar Chen Yun, China's 'bird' was allowed to irrevocably break free from its 'cage'.

As has been shown, from the late-1970s a new economic rationality had emerged in China. Based on market principles, the advocates of this new rationality sought not only increased production but also increased efficiency and profit. Subsequent chapters will examine how this new economic rationality intersected with particular instances of China's environmental reform. An examination will now be made of the economic reforms that Chinese officials undertook in the 1990s to turn perennially loss-making 'state-run' enterprises into profitable 'state-owned' companies able to compete in China's new socialist market economy. Understanding these SOE reforms is also crucial to understanding how Chinese officials sought to balance the contradiction between environmental protection and socio-economic development.

The new vanguard and new contradictions. While the reforms in the 1980s and early 1990s were significant, they were unable to render China's SOEs competitive in China's new 'socialist market economy'. Despite the infusion of profit-orientated managers, the institutional structure and organisational responsibilities of these SOEs were still directed towards operating in a socialist economy. Indeed, studies into the Chinese economy at this time show the growing unprofitability of SOEs. For example, US economist Nicholas Lardy noted that '[i]n 1985, 9.6

[428] Walter and Howie 2012.
[429] Saich 2004, 109.

per cent of all "within budget" industrial SOEs declared losses, such losses amounting to RMB 2.7 billion'. Ten years later, around 44 per cent of such firms were declaring losses totalling RMB 40.9 billion. Lardy claimed that the situation was so dire that Chinese authorities publicly admitted for the first time since the creation of the PRC that China's SOEs posted a total net loss.[430] Despite their unprofitability, the Chinese government continued to support SOEs through state subsidies from the central budget along with, increasingly, loans from state-owned banks, rather than allow these enterprises to close down. This is a clear manifestation of the tension between China's new economic rationality and political objectives in post-reform China.

However, by 1995, China's political leaders, including Jiang Zemin, had acknowledged that many small to medium SOEs were ill-equipped to compete with the new non-state and semi-state enterprises that had multiplied since the early 1980s. The Chinese government decided to let these unprofitable enterprises 'change their ownership structure [through] contracting and leasing…as well as selling the firm or transforming it into an employee-held company or cooperative'.[431] The aim was to 'grasp the big [enterprises], let go of the small [enterprises]' (抓大放小). In 1997, the 15th Party Congress 'gave the official green light to privatisation'.[432] Because privatisation was a sensitive word, the Chinese government referred to this process as 'restructuring' (改制). The restructuring of these companies paved the way for potential management buyouts of tens of thousands of inefficient and loss-making enterprises managed by the soon-to-be-disbanded Ministry of Light Industry and Ministry of Textile Industry.[433] For example, in 1997, small SOEs constituted only 18 per cent of state-owned assets but accounted for the majority of losses from the SOE sector. In addition to privatisation, the government allowed these smaller companies to go bankrupt, rather than continue to subsidise them with state-financed loans.[434]

As the initial part of the 'grasp the big' dictum suggests, the aim was not to sell all state companies. For SOEs within sectors of the economy that were considered too strategic to privatise, the government chose instead to 'separate the functions of government from

[430] Lardy 1998, 18.
[431] Garnaut and Song 2004, 93.
[432] Huang and Zheng 2014, 125.
[433] Pearson 2015, 31. Chinese organisational names were, respectively, 轻工业部 and 重工业部.
[434] Chapter Two in Huang 2008.

enterprises' (政企分开). The state would retain between 500 and 1000 larger SOEs, but corporatise them, thereby creating enterprises owned, but not directly controlled, by the government. The government hoped that this would provide SOEs with greater access to foreign capital and further increase managerial entrepreneurship, leading to increased efficiency and profitability. With these corporatisation reforms, the Party pursued the creation of powerful *chaebol*- and *keiretsu*-like enterprises in the hope that they would become as economically profitable and internationally competitive as their South Korean and Japanese counterparts.[435] The government retained ownership because SOEs were still perceived as contributing heavily to the strategic economic plans for China's 'comprehensive national power' (综合国力). These SOEs also provided tax revenues and allowed the Party to control the 'commanding heights' of the economy in areas such as energy, banking, shipping and military industries.[436] To encourage the development of these modern enterprises, in 1998 then-Premier Zhu Rongji 朱镕基 disbanded many industrial ministries that had formerly controlled SOEs. The aim in these early years was to have between 30 and 50 'national champions' as part of a 'national team' (国家队) that would dominate their respective industries but also compete globally.[437]

These reforms illustrate how China's new economic rationality continued to evolve incrementally. The advantage of this incremental change over a 'big bang' approach was that China's leaders could learn from experience and act accordingly. As later chapters will show, these lessons would later include the need to inject more ecological rationality into the evolving economic rationality that emerged from the 1978 reforms.

In economic governance reform, the State Council created the State-owned Assets Supervision and Administration Commission[438] (SASAC) in an attempt to establish firmer control over SOEs. Between 1998 and 2002, the State Council tasked several government departments with the responsibility of controlling SOEs, such as the State Economic and Trade

[435] *Chaebol* (South Korea) and *Keiretsu* (Japan) are large business groups (or conglomerates).
[436] Pearson 2015, 32; Yu 2014, 166.
[437] Xu 2012, 6; Naughton 2015.
[438] Chinese name is 国务院国有资产监督管理委员会.

Commission[439] (SETC), the Ministry of Finance[440] and the Central Enterprise Work Commission.[441] These departments all previously had a degree of control over SOEs, but their power was spread across all three bureaucratic agencies. This situation changed though with the creation of SASAC, with this newly-created commission taking on the ownership and management of non-financial SOEs. This new organisation inherited personnel from the ministries and commissions mentioned above and became 'an explicit state body that would have "legal person" status to push SOEs forward to reorganise, restructure and renovate'.[442] The State Council mandated a dual-part responsibility for SASAC: to facilitate the growth of 'national SOE champions', but also to ensure these SOEs acted in the national interest.[443] Former SASAC Chairman Li Rongrong 李荣融 communicated the government's ambitions for its SOEs to operate according to an economic rationality when he exhorted at an SOE planning event that 'if you [central enterprises] cannot influence others, then others will influence you, and you should just get out'.[444] His statement illustrates how issues of economic profitability and efficiency had now become intertwined with China's national interest. The functional activities of the SOEs were now separated from the former Maoist ideological functions, and SOEs were now free to address increasing efficiency and making profit.

Since SASAC was created in 2003, it has overseen the growth of state-owned assets as well as a reduction in the number of SOEs it administers in its ongoing efforts to create 'national champions'. It has reduced the number of SOEs under its management from its original 196 companies in 2003 to 102 companies in 2018. This period has also witnessed the rise of 'conglomerate companies' (集团公司), often with hundreds of subsidiaries operating below the level of an overarching parent company.[445] For instance, in 2011, when SASAC managed 121 firms, SASAC noted that there were 23,738 subsidiary companies.[446]

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[439] Chinese name is 国家经济贸易委员会.
[440] Chinese name is 财政部.
[441] Chinese name is 中央金融工作委员会.
[442] Oi and Zhang 2014, 150.
[443] Brødsgaard 2012, 630; Naughton 2015.
[444] Quoted in Naughton 2005, 7.
[445] Oi and Zhang 2014.
[446] Naughton 2015, 53.

Overall, the wealth and profits of SASAC's assets under management have grown. In 2018, China's centrally-owned companies amassed 29.1 trillion yuan in 'operating revenue' (营业收入) and 1.23 trillion yuan in 'total profit' (利润总额).[447] Furthermore, SASAC's SOE assets under management have grown from 5.8 trillion in 2003 to 80.39 trillion yuan in 2018.[448] The revenues amassed by the leading corporations represent a staggering increase from the early 2000s and have registered on the international financial scale. For instance, in the top-ten of the 2019 Forbes Global 500 list – a ranking based on revenues – SASAC-managed SOEs occupy second, fourth and fifth position.[449] China's new economic rationality has clearly achieved success in terms of modifying the behaviour of its companies to reflect international capitalist standards even if scholars only confer so much credit on SASAC for these accomplishments.[450]

Finally, China's new economic mindset also allowed China's state-owned and private companies to seek economic opportunities from abroad rather than relying on Maoist notions of self-reliance and national development. In 1997, Jiang Zemin stated that 'we must not only actively attract foreign enterprises to invest and set up factories in China but also to actively guide and organise powerful domestic enterprises to "go out" (走出去)'.[451] Through the Ministry of Commerce[452], Chinese authorities from the late 1990s gradually promoted their outward expansion to take advantage of global investment opportunities. Moreover, as noted in Chapter Two, in 2001, after fifteen years of negotiations, the PRC formally acceded to the World Trade Organisation. China is now the largest exporter of merchandise in the world, exporting over 2

[447] Guowu yuan guoyou zichan jiandu guanli weiyuanhui. 2019. "Xinhua wang: 2018 nian zhongyang qiye shouru yu lirin jun liang wei shu zengzhang" (Xinhuanet: double-digit growth in revenue and profit for central enterprises in 2018), 15 Janurary, http://www.sasac.gov.cn/n4470048/n8456886/n10253673/n10253682/c10261691/content.html. Accessed 23 June 2019.
[448] Xinhua wang. 2015. "Guo qi gaige: chong zheng daguo jiliang" (State-owned enterprise reform: reshaping a great power's backbone), 29 November, http://www.xinhuanet.com/politics/2015-11/29/c_128478962.htm. Accessed 23 June 2019; Guowu yuan guoyou zichan jiandu guanli weiyuanhui. 2019. "2018 nian 1-12 yue quanguo guoyou ji guoyou konggu qiye jingji yun hang qingkuang" (Economic performance of state-owned and state-owned holding companies nationwide from January to December 2018), http://www.sasac.gov.cn/n2588035/n2588330/n2588370/c10315327/content.html. Accessed 22 June 2019; Naughton, 2015.
[449] Fortune. 2019. "Fortune Global 500," https://fortune.com/global500/2019/. Accessed 23 June 2019.
[450] Naughton 2015, 47; Naughton 2008, 1.
[451] Chen Yangxiong. 2008. "Jiang Zemin 'zouchuqu' zhanlüe de xingcheng jiqi zhongyao yiyi" (The shape and significance of Jiang Zemin's 'going-out' policy), http://theory.people.com.cn/GB/40557/138172/138202/8311431.html. Accessed 25 January 2017.
[452] Chinese organisation name is 商务部.

trillion worth of manufactured goods in 2017.[453] China's politicians acknowledge that economic globalisation has benefited rather than hindered China's economic development. For instance, in 2013, Chinese president Xi Jinping began championing the 'one-belt, one-road' (一带一路) or New Silk Road initiative that seeks to link up 65 countries from China to Western Europe with several hundred billion dollars of investment slated for infrastructure projects.[454] The stated aim of this initiative is to further weave China into the fabric of the global economy.

The SOE reforms outlined in this section have shown that Chinese authorities increasingly view the modernisation of the PRC within a market-based economic rationality. No longer do they accept loss-making enterprises as the price of a 'cradle-to-grave welfare system'. Instead they have privatised (or 'restructured') those enterprises that they believed were ill-suited to China's new socialist market economy. Chinese authorities have allowed and encouraged the remaining central SOEs to exploit their monopolistic positions in their respective markets, with some of China's SOEs becoming the largest companies in the world in terms of operating revenue. China's leaders have also sought to encourage Chinese companies to further exploit new growth avenues provided by the global market economy. What this illustrates is that Chinese authorities' commitment for economic success is now based on a new post-Mao economic rationality of market growth and profitability.

Conclusion

This chapter started by outlining the political institutions that shape economic and environmental policy in China. It showed that the CCP, the government and the NPC shape environmental policy discourse in China, with the Party occupying a dominant position over the latter two institutions. Yet despite their dominance, it is Chinese government institutions, rather than the Party, that formulate and enact policy through the State Council and its various government agencies. Additionally, China's new breed of government bureaucrats has become professionalised following Deng's decision to retire many Party cadres whose experiences and outlook were shaped by the class struggles of Maoist China. Moreover, it is the NPC that passes and reviews China's environmental laws. The first half of the chapter also detailed the

[453] Merchandise statistics drawn from WTO. 2017. "WTO: Data," https://data.wto.org/. Accessed 12 March 2018.
[454] Wade, Geoffrey. 2016. "China's 'One Belt, One Road' initiative," August, https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/BriefingBook45p/ChinasRoad. Accessed 23 June 2019.

fragmented and factionalised nature of Chinese governance, providing further context to the research methods outlined in Chapter Three. This institutional background provides the necessary context for the discursive material drawn in Chapters Five to Nine inclusive.

The second half of this chapter demonstrated how China's gradual economic reforms altered China's economy, through new economic actors, behaviours and motivations, despite overall continuity by way of political governance. The CCP still runs China, according to self-styled 'Marxist-Leninist' organisational principles. However, because of these reforms, the Party now presides over an economy that functions according to the capitalist rationalities of profitability and efficiency. China has largely overcome its Maoist economic mindset that prioritised politics and ideology over economic rationality, and through reforms to agriculture, private industry and SOEs they appear to have changed China's economy and society irreversibly, especially when viewed within the overall context of China's economic success. These transformations were not achieved without painful social, political and economic tensions, as this chapter has illustrated. Under the Chinese political regime, these tensions were played out within the 'party state' organs, with reformers eventually emerging victorious. However, as the remainder of this thesis will illustrate, ongoing economic rationality continues to raise new challenges and contradictions for the Chinese economy, polity and national interest. One of the growing sets of contradictions involves the impact that this new economic growth has had upon the environment. The remainder of this thesis explores the evolution of these concerns, and details how Chinese authorities have addressed them. The next chapter will explore the first environmental reform measure of this thesis, 'cleaner production', to examine where this policy idea emerged from, what underpinned it, and whether it is consistent with notions of ecological modernisation.

Chapter Five: Cleaner Production in China

Chapter Four described China as a nation in economic flux. Over four decades, Chinese authorities have implemented a series of gradual reforms that have altered the political, societal and economic makeup of the PRC. The CCP still rules China in an authoritarian manner. It has retained the right to select and veto appointments to the highest levels of the government and state-owned enterprises (SOEs), but as a result of these economic reforms, the senior leadership has allowed a capitalistic *economic rationality* to develop, albeit with unique 'Chinese characteristics' (中国特色). Rather than rely on socialist planners in Beijing to grow the economy, China's politicians have gradually allowed China's citizens to base their economic behaviour on market forces.

This chapter and the following four chapters examine how the Chinese government have attempted to reconcile competing economic and environmental objectives. Have Chinese policymakers chosen to incorporate ecological modernisation ideas within their environmental policy agenda? If they have chosen to incorporate these ideas within their environmental policy agenda, what environmental concerns have been the key drivers for their inclusion? Moreover, which institutions and officials have been the notable advocates for the inclusion of ecological modernisation ideas within this policy agenda? These are important questions for the study of Chinese environmental policy because they seek to determine the rationale and personnel behind certain environmental reforms.

This chapter draws on evidence from Chinese policymakers as well as relevant government policy and legislation. It starts by examining the history and development of an 'ecological rationality' in China towards industrial, specifically air, pollution up to the early 1990s. The chapter will then examine the concept of 'cleaner production' (清洁生产). The chapter will argue that Chinese policymakers' call for cleaner production manifests itself as an example of ecological modernisation beliefs through their reflexive reasoning, the call for market mechanisms to foster cleaner production and the convergence of economic and ecological rationality within China's environmental policy agenda.

The Emergence and Evolution of Ecological Rationality in Maoist China

This chapter starts by examining the origins of China's environmental awareness, or its ecological rationality. It is necessary to look back at the early unease that emerged among

China's elite over industrial pollution and waste during the Maoist era to understand why the National People's Congress (NPC) unanimously passed the *Law of the PRC on the Promotion of Cleaner Production* in 2002.[455] In the early years of the PRC, there were small numbers of high-level officials who slowly became aware that China's Soviet-style industrialisation generated harmful levels of industrial emissions, namely air, water and solid waste pollution, or what the Chinese state termed 'the three wastes' (三废). The first senior Party official to express disquiet concerning these industrial emissions in the 1950s was Premier Zhou Enlai. While many of his comrades kept their focus on growing the nation's fledgling socialist economy, Zhou's comments during this period indicate that he believed China's socialist modernisation was far from a benign phenomenon. For example, during a 1958 inspection tour to Guangdong Province, he was reported to have stated that China was producing too much pollution, and it needed to 'engage fully in comprehensive utilisation and make full use of the "three wastes" to create benefit from harm and to benefit the people'.[456]

However, the drive of Maoist socialist development hampered the development of early concern towards industrial waste. This was due to the fact that China's modernisation was intertwined with socialist ideology, fervently championed by 'leftist thinking' (左路线) officials. During this period these officials argued that China, because it was a socialist nation and such nations served the people, could not harm its people through environmental pollution, unlike capitalist countries.[457] They asserted that such harmful characteristics were incongruent with the modes of production inherent to socialist nations. Socialist nations could produce pollution but at negligible and non-harmful levels, especially when compared to capitalist nations. Instead, severe 'industrial pollution' (工业污染) was better explained by capitalism and its skewed profit motives.[458] In some ways, this leftist thinking in China was not dissimilar to some elements of the 'treadmill of production' concept expounded by neo-Marxists from the 1980s onwards.[459] Premier Zhou adopted this neo-Marxist belief in that, in general, he blamed

[455] Abbreviated as *Cleaner Production Promotion Law.*
[456] Quoted in Wang Ruifang 2012, 78. 'Comprehension utilisation' refers to the utilisation of waste products through recycling and better utilisation of materials in the production process. This objective will be further discussed in Chapter Six.
[457] Ibid.
[458] Ibid. See also Smil 1980b, 14-18.
[459] See neo-Marxist argument regarding the relationship between capitalist development and environment impact in Chapter Two.

environmental degradation on the motive force of capitalist production: 'capitalist countries cannot solve industrial pollution because of their private ownership, anarchic production and the pursuit of maximum profits'.[460]

Despite maintaining this ideological stance, Zhou also understood that China had experienced escalating levels of environmental pollution. He might have believed that China's industrial emissions had different underlying causes to those of capitalist nations, yet Zhou conceded that China could no longer assert that its brand of socialism had a light impact on the environment. In a 1971 speech, he referred to Britain's past afflictions with 'smog' (烟雾) in its large urban cities, declaring that 'China's urban environmental issues were not lighter than those in Western countries'.[461] With this point in mind, he announced that China 'must solve industrial pollution' because it was a socialist nation and any economic development that it undertook 'absolutely must not do any harm for future generations'.[462] Furthermore, at China's 1971 National Planning Meeting, he returned to his 1950s theme of 'three wastes':

> At present, public hazards (公害) have already become a huge global problem. The danger of water waste, exhaust waste, and solid waste in the United States is considerable. We must eliminate the three harms. We cannot avoid comprehensive utilisation [of these wastes]. We must energetically eliminate these wastes, converting the 'three harms' (三害) into the 'three benefits' (三利).[463]

Zhou Enlai's view of waste pollution at this time was that it was a 'health issue' (卫生问题). He had little regard for notions of environmental protection that characterised the Western discussion of environmental degradation during the 1960s.[464]

Nonetheless, Zhou's comments illustrate a nascent ecological rationality at the highest levels of China's Maoist political leadership. It stemmed from Zhou's awareness of the destructive impact of industrial development. He understood that China's socialist industrialisation had significantly contributed to harmful levels of air, water, and solid waste pollution. He also understood that pollution was a cross-generational problem. Yet, he was unable to link it to broader concepts in ecology, let alone appreciate that industrial development could have destabilising effects on the ecosystem. The knowledge of ecological concepts up

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[460] Quoted in Li Xiang 2009, 44.
[461] Quoted in Zhang Lianhui 2014, 164.
[462] Quoted in ibid.
[463] Quoted in Yang Wenli 2008, 22.
[464] See Carson 1962; Boulding 1966.

until 1972 in China remained underdeveloped (see discussion below). This fact is unsurprising given that Chairman Mao governed over a closed and autarkic nation. The ideological dogmatism surrounding the population debate, whereby authorities led by Mao shunned population control in the 1950s and 1960s because of the anti-Malthusian arguments of Karl Marx and Fredrich Engels,[465] strongly suggests that if a Chinese-version of Rachel Carson had emerged during this period with an ecological perspective on China's industrial emissions it would have been silenced quickly.[466]

Nevertheless, despite their limited comprehension of ecology, from 1971 onwards Chinese officials slowly began to view pollution as an 'environmental issue' (环境问题). The international community provided the catalyst for this change when the United Nations allowed the PRC to replace the Republic of China (Taiwan) as the sole United Nations representative for China. Just a few months after the PRC was accepted as a member of the United Nations, it received an invitation to attend a global conference on the environment in Sweden. The Chinese government under Zhou Enlai's direction accepted that invitation and subsequently sent three delegates to the 1972 United Nations Conference on Human Environment in Stockholm. This global conference provided the catalyst for environmental change by introducing the notion of 'environmental protection' (环境保护), a concept that would lay an essential foundation for an ecological rationality within China's government.[467] Leading up to the conference, one of the three delegates to the conference, Qu Geping, stated that Zhou Enlai was starting to view China's pollution as more than just a health issue that should be supervised by the Ministry of Health. China would have to 'formulate environmental protection measures' when the delegates returned.[468] Indeed, from 1973 onwards, China began to establish new organisations with a mandate to tackle environmental pollution and degradation.[469] Moreover, the conference introduced Chinese officials to new ecological concepts, such as 'environmental protection' and 'acid rain' (酸雨) allowing a higher level of understanding of ecosystems and

[465] Engels 1946 [1876].
[466] Shapiro 2001, 21-66.
[467] Economy 2010, 93-95.
[468] Quoted in Qu Geping 2000, 86.
[469] See Chapter Two.

their complexity. Qu Geping has recollected in interviews that he and his other colleagues were introduced to these environmental concepts at this conference.[470]

In the years following the Swedish conference, the idea that China must protect the environment against pollution became more widespread among government officials. In 1973, the State Council convened the first National Environmental Protection Conference in Beijing.[471] This two-week meeting, which Zhou Enlai ordered to be convened, included representatives from across China's political apparatus, including Party and military delegates, as well as government representatives from planning commissions, research institutes, factories, mines and China's various provinces.[472] Over 10,000 delegates attended various meetings throughout the fortnight.[473] From the conference proceedings, the State Council published *Certain Provisions on Protecting and Improving the Environment* trial draft. The importance of this policy document was the '32 character principle' (32 字方针): 'overall planning, rational distribution, comprehensive utilisation, turn harm into benefit, rely on the masses, involve everyone, protect the environment, and benefit the people', which framed how China would protect its environment.[474] This principle, as Chinese scholars have stressed, introduced China's 'first environmental protection guidelines'.[475] From this point on, China's ecological rationality would have a policy basis to challenge the established economic rationality in China.

There was little public commentary on environmental concerns from senior officials up until the end of the 1970s. Regardless, this period was marked by the creation of new environmental publications that provided a policy forum for officials to make a case for environmental reform. The most important of these early publications was *Environmental Protection*. In the foreword

[470] Interview with Qu Geping in Liu Zhongqin 2005, 11.
[471] Economy 2010, 95.
[472] Gov.cn. 2009. "1973 Nian: huanjing baohu kaishi qibu" (1973: environmental protection begins), 30 August, http://www.gov.cn/jrzg/2009-08/30/content_1404821.htm. Accessed 16 March 2018.
[473] Zhai Yaliu 2012, 68.
[474] Zhonghua renmin gongheguo shengtai huanjing bu. 2018. "Di yi ci quanguo huanjing baohu huiyi" (First National Environmental Protection Conference), 13 July, http://www.mee.gov.cn/zjhb/lsj/lsj_zyhy/201807/t20180713_446637.shtml. Accessed 24 February 2019.
[475] Wang Ruifang 2012; Zhai Yaliu 2012.

to its first edition, the editors of *Environmental Protection* outlined how they saw the environmental challenges brought forth by China's socialist economic development:

> While we are engaged in the construction of industry, we must also consider protecting the environment from pollution. This primary task embodies the superiority of the socialist system. The big issue is what line to implement and what path to take. Engaging in just production and not managing the three wastes cannot be tolerated by a socialist system.[476]

There were other environmental publications created during the 1970s. The Chinese Academy of Sciences published *Environmental Science* in 1976, providing a platform for China's growing community of environmental scientists. Both publications still exist today, and they remain among the leading environmental policy and environmental sciences journals in China. The reference list of this thesis and the discussions in the following chapters are an important means of measuring the extent to which ecological modernisation ideas have been included within China's environmental policy agenda.

The chapter so far has demonstrated that during the Maoist era, senior Party officials became increasingly concerned with mounting pollution. However, the rapid economic growth of the Reform era (1978 onwards) led to heightened apprehension over the issue. Even though Party elder Deng Xiaoping would keep his focus on macro-level economic reforms (see Chapter Four), he also noted the seriousness of environmental pollution. In a 1979 visit to Guangxi Province, Deng observed that factories had severely polluted 'the good landscape of Guilin and it must be stopped'.[477] Furthermore, in the first revision of the Party Constitution since Mao Zedong's death in 1976, China's leaders inserted environmental provisions, stipulating that 'the nation will protect and improve living and ecological environments and prevent pollution and other damage'.[478] Within China's political leadership, China's coal-reliant energy system became the main focus of this concern. Premier Zhao Ziyang told attending delegates in a 1983 speech to the Fifth Session of the Fifth NPC that 'more and more coal is being used in China, and it is unacceptable to ignore the environment'.[479] So, within this context, the reform

[476] "Qianyan" 1973.
[477] Quoted in Qin Shusheng, Sui Xuejia and Zheng Xue 2013, 71.
[478] Zhonghua renmin gongheguo shengtai huanjing bu. 2019. "Zhonghua renmin gongheguo xianfa (huanjing baohu tiaokuan zhailu)" (Constitution of the People's Republic of China (environmental protection clauses extracts)), http://zfs.mee.gov.cn/fl/198212/t19821204_81956_wap.shtml. Accessed 23 June 2019.
[479] Quoted in Li Ximing 1983, 1.

conditions in the early 1980s were ripe for nascent ecological rationality to challenge economic rationality.[480]

Qu Geping: China's first environmental bureaucrat. Once senior Party leaders had acknowledged environmental pollution as a significant issue by the early 1980s, a new-breed of professional Chinese bureaucrats started to direct their attention to environmental problems and their policy solutions. The most notable of these new bureaucrats was Qu Geping, whose views were raised briefly in the previous section.[481] Qu trained as an engineer, and his career coincided with several critical environmental reforms of the 1970s and 1980s. Qu was part of the three-person delegation that went under Zhou Enlai's instruction to the United Nations 1972 environmental conference in Sweden. Qu then served between 1974 and 1982 as the inaugural director of the State Council's Environmental Protection Leading Small Group Office and in 1976 the State Council appointed him as the first Chinese representative to the United Nations Environmental Programme (UNEP) in Kenya. In the 1980s, Qu then become the inaugural vice-director of the National Environmental Protection Commission and by the late 1980s he became the first director of the State Environmental Protection Bureau (SEPB) (1987–1993).[482] As Chapter Three noted, Qu Geping is held in such high regard in China that its media often refers to him as the 'father of Chinese environmentalism'.[483] Qu's insights on China's range of environmental issues would place him at the forefront of Chinese policymaking discourse. The following chapters will show how he advocated policy responses to China's environmental problems that embodied many principles inherent to ecological modernisation.

In the 1980s, Qu Geping provided some of the most candid statements yet provided by a senior government administrator regarding China's growing pollution problem. Writing in a 1980 issue of *Environmental Protection*, Qu Geping characterised China's experience of air pollution as 'shocking' (触目惊心). He also argued that the worrying state of pollution in China

[480] See Chapter Four.
[481] See also Chapter Three.
[482] Song Xu 2016.
[483] Zhao Ti. 2005. "Qu Geping: Zhongguo 'huanbao zhi fu'" (Qu Geping: China's father of environmental protection), Renmin wang, 28 March, http://www.people.com.cn/GB/14576/33320/33325/33789/3275985.html. Accessed 23 June 2018.

would only worsen, based on his 'rough calculations' (粗略测算). Qu directed the thrust of his paper at those in influential government positions who still saw China's 'superior socialist system' (优越的社会主义制度) as environmentally benign, such as those 'leftist thinkers' influenced by the 'Gang of Four' (四人帮). Linking past mistakes with the now discredited Maoist Gang of Four was an astute political move. He stated that those 'arguments did not match the actual situation in China'.[484] Instead, he forecasted that by 1985 China's levels of 'soot' (烟尘) and 'sulphur dioxide' (二氧化硫) emissions would 'more than double', arguing that 'now is the time to enhance environmental protection measures'.[485] Qu followed up those comments with a 1982 speech to the National Ecological Economics Symposium in Beijing. In this speech, he further detailed China's growing levels of air pollution, describing to the attendees the problems concerning China's reliance on coal for its primary energy. He said that China mined over 600 million tonnes of coal each year, and its subsequent combustion led to 'over 14 million tonnes of sulphur dioxide being discharged into the atmosphere each year'.[486] Such coal combustion led to 150 million tonnes of 'ash' (灰分) emitted into the atmosphere in 1981, and he remarked that these increased emissions had given rise to 'acid rain' which had emerged in many provinces across China.[487] In the first few years of China's economic reforms, Qu's comments reflected how he was already viewing China's economic transformation from an ecological perspective.

Moreover, in his speeches and essays, Qu not only quantified China's growing pollution problem but also explained its root causes. He argued that the liberalisation of China's economy profoundly impacted its environment. Township village enterprises (TVEs) were a prime target of his policy discussion. TVEs, as the last chapter detailed, were loosely-regulated, semi-socialist enterprises which emerged and then flourished after the Chinese authorities disbanded China's former Maoist communes. They operated outside of the government's socialist planning regime, and this lack of control concerned China's environmental officials, especially since TVEs inherited out-dated equipment built during the early years of the PRC – an era that predated notions of environmental protection. Qu stressed in a 1983 article that even if the rapid expansion of TVEs would bring short-term economic and social benefits to some

[484] Qu Geping 1980a, 3.
[485] Ibid, 4.
[486] Qu Geping 1983a, 5.
[487] Ibid.

of the poorest regions of China, over the long-term TVE expansion would potentially prove ruinous for the environment:

> With the development of the rural economy, the county commune industry [i.e. township village enterprises] will grow dramatically. On the one hand, we must appreciate the positive effect of this development on economic prosperity and the improved living standards of rural citizens. At the same time, we must also understand the possible harm to the rural ecological environment [from pollution]. Therefore, it is necessary to adopt appropriate guidelines, policies, technological and economic measures to correctly handle the relationship between the development of industry and the protection of rural ecology. The relationship between immediate interests and long-term interests should lead to the unification of economic benefits and environmental benefits.[488]

The theme of TVE development and environmental protection would interweave through many of Qu's policy arguments over the coming years. For instance, in a 1986 speech summarising the environmental protection policy measures for the upcoming Sixth Five-Year Plan, Qu noted that TVEs contributed to 'one-fifth of China's "three-wastes" emissions'; a contribution that was 'still growing'.[489] Qu's remarks illustrate how Chinese officials were beginning to grapple with the severe contradictions that their nation's economic development presented. On the one hand, the growth in TVEs encouraged the 'development of rural economies' in a fashion hitherto unseen in the history of the PRC. That development brought forth 'prosperity' (繁荣) and improved 'standard of living' (生活水平) for those underdeveloped regions that had languished during the Maoist era.[490] China's post-Mao economic rationality would suggest further encouragement of TVEs. However, ecological rationality was starting to shape how Chinese officials like Qu Geping saw post-Maoist industrialisation. Qu appreciated that in the enthusiasm for economic development, many new market actors would pursue immediate economic benefits with little or no regard for the environment, and this would lead to environmental harm.

Perceiving the loosely regulated aspect of TVEs as a concern, Qu argued that improved 'environmental management' (环境管理) was the best way to manage growing pollution. In a 1983 speech to the Developing Nation Environmental Impact Assessment Academic Symposium, he argued that environmental impact assessments (环境影响评价)[491] linking environmental and economic benefits could reduce environmental pollution:

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[488] Qu Geping 1983b, 16.
[489] Qu Geping 1986, 5-6.
[490] Qu Geping 1983b, 16.
[491] Also referred to as the 'three simultaneous' 三同时.

> The environmental impact assessment system is a significant reform of traditional modes of economic development. For traditional economic development, what is often considered is immediate economic benefits with little or no consideration of environmental benefits. As a result, environmental pollution and destruction inevitably occur, leading to sharp opposition between economic development and environmental protection. Implementation of the environmental impact assessment system has changed this situation. It has achieved the unification of economic and environmental benefits and the coordinated development of economy and environment. The process of environmental impact assessments is the process of recognising the interdependence and mutually-restrained relationship between the ecological environment and human economic activities.[492]

Although tasked with cleaning up the environment, environmental management in China at the time consisted more of command and control measures rather than any economic incentive reforms based on ecological modernisation-inspired policy. For instance, China's environmental protection measures up until the late 1980s consisted of concentration-based discharge limits, the aforementioned environmental impact assessments and a pollution-levy system.[493] Apart from the pollution-levy system, these measures resorted to 'command and control', relying on the government to set rules that defined lawful social or economic behaviour.

The consensus view among China's officials in the 1980s was that these command and control measures should characterise how the Chinese government responded to environmental pollution. This outlook remained consistent with the socialistic rather than capitalistic ethos propounded by the CCP. As the discussion has suggested so far, and the following sections and chapters of this thesis will further demonstrate, some signs in this period hint at China's later adoption of ecological modernisation policies. Officials were starting to include ecological notions into their policy discussion, and this new rationality was challenging embedded economic ways of thinking.

However, at this stage a number of questions can be raised about the progress of ecological rationality: why was there such reticence to adopt ecological modernisation measures? Why not encourage the rapid adoption of clean technology to supplement environmental management? To answer these questions, it is necessary to review the policy arguments of former Premier Li Peng 李鹏 while he was a senior official in the Ministry of Electric Power[494] and the head of the National Environmental Protection Commission. These arguments embodied the prevailing economic rationality behind China's then-environmental policy

[492] Qu Geping 1983c, 7.
[493] Shi 2003; Shi and Zhang 2006, 285.
[494] Chinese name was 电力部.

decisions and why China ultimately would not embrace cleaner production technologies until the 1990s.

Li Peng and the pervasiveness of economic rationality. Li Peng's policy views reveal the persistent strength of economic objectives and its predominance over ecological concerns. Li Peng, like Qu Geping, was an engineer by training, but, in contrast with his soon-to-be deputy, he served in government and Party positions within the energy sector. He moved up through the Party and government system, and, by 1979, he was a vice-minister in the Ministry of Electric Power under its then-minister Qian Zhengying 钱正英 – a position he would hold for four years. In 1984 Li was promoted to vice-premier within the State Council, in conjunction with his appointment to the National Environmental Protection Commission.[495] As a career path like this would suggest, Li Peng in the 1980s was more concerned with economic objectives than environmental concerns, viewing them for a period as mutually-exclusive objectives, especially concerning pollution-prevention technology.

However, even during his career managing China's thermal coal power plants, Li appears to have accepted that China's environmental problems resulted from its 'reliance on coal' (以煤为主). In a speech to the Second National Environmental Protection Conference (December 1983–January 1984), he conceded that coal combustion 'undoubtedly created air pollution, bringing about harmful effects for the environment'.[496] Moreover, in the same speech, he also noted how, due to this reliance, 'in recent years…there has been an increasing number of acid gases such as sulphur dioxide discharged into the atmosphere. Acid rain hazards have occurred in many areas south of the Yangtze River and parts of the north'. Li also presided over the incorporation of environmental protection as a 'fundamental policy' (基本国策) of the PRC, placing it in the same league as economic reform and population control.[497] In a 1985 speech to the first annual meeting of Chinese and foreign specialists held at the Chinese Academy of Environmental Sciences[498], Li repeated his view that China 'must avoid taking the old route of

[495] Renmin wang. 2000. "Li Peng tongzhi jianli" (Comrade Li Peng's resume), 3 July, http://www.people.com.cn/GB/ channel1/10/20000703/127420.html. Accessed 22 June 2019.
[496] Li Peng 1984, 6.
[497] Ibid.
[498] Chinese name is 中国环境科学研究院.

polluting first, cleaning up later' (避免走先污染后治理的老路). He also remarked that if China did not change its approach, it would be 'likely to cause serious economic losses and costs that were too large'.[499]

Like Qu Geping, Li directed his opprobrium towards the rapid development of the TVEs. Lauding socialist economic logic rather than market logic, he argued that their development, rather than that of state-run enterprises, was the leading cause of environmental pollution. In that same 1985 Chinese Academy of Environmental Sciences meeting, he outlined that although TVEs were 'small scale' (规模小), the pollution they emitted across all parts of the biosphere was 'very serious' (很严重).[500] Li escalated his attack on TVEs in a speech he gave to the 1989 Third National Environmental Protection Conference in his new position as Premier of the State Council. Li put forward the view that TVEs not only caused economic problems such as inflation and resource misallocation, but they also placed 'tremendous pressure on the environment', and their pollution was 'an acutely growing trend', especially with regard to their 'blind projects' (盲目上项目) that had little or no concern for environmental regulations.[501] He noted in particular that:

> many of these projects consume large amounts of energy, have low efficiency, waste resources, and cause severe pollution. One of our goals with rectification and control is to adjust the economic structure, industrial structure and production mix to enhance the efficiency of enterprises and reduce consumption.[502]

'Improvement and rectification' (治理整顿) included such measures as 'halting production, closing down enterprises, transferring operations to new products or moving operations to different regions' (known as 关停并转迁). This signalled Li's on-going preference for command-and-control measures over ecological modernisation strategies.[503]

Beyond ecological rationality, Li's comments also foreshadowed the re-emergence of socialist economic rationality by challenging the merits of market-led TVE development. The political-economic tensions of the 1980s could also provide an added context to interpret Premier Li's remarks. Li was aligned with the conservative faction in China, led by leading

[499] Li Peng 1985a, 3
[500] Ibid.
[501] Li Peng 1989, 3.
[502] Ibid.
[503] Ibid, 4.

State Planner Chen Yun 陈云, who wanted authorities to reassert their control over the economy after many years of decentralisation and liberalisation.[504] Thus, Li's environmental focus was directed more at the non-socialist sector of the economy. For example, he noticeably omitted mention of SOEs when raising environmental governance matters. Yet, while SOEs were being 'outgrown' by the non-planned sector, they still generated significant amounts of pollution.[505] Li's reluctance to move beyond command-and-control measures stemmed from his ongoing loyalty to socialism and socialist planning. As the following sections demonstrate, the allure of 'cleaner production' is predicated upon a belief in the power of market forces to provide a technological path for enterprises to move towards sustainable development, something then inimical to Li's ideological stance. Consequently, political tensions over the direction of the economy and ecological awareness would remain until the early 1990s.

Even though Li Peng understood that China's rapid industrialisation was causing despoliation of its environment, he viewed investment in pollution-abatement technology too costly for China's infant stages of post-Mao economic development. Li held this view before he took up his chairmanship of the National Environmental Protection Commission. In a 1982 essay, he claimed that 'pollution management accounted for one-third of power plant investment' in developed nations.[506] He believed that this investment was too expensive because China 'did not have such amounts of money to spend'. As a result, China needed to chart 'its path' (自己的道路) through constructing taller chimney stacks and shifting power plants to rural areas where 'population density' (人口密度) was much lower and therefore could accommodate 'relaxed [emission] standards'.[507] Li remained more concerned with developing China's power-generating capacity, which could not keep up with the growing demand from China's flourishing special economic zones, as his other articles at the time would attest.[508]

After Li Peng was promoted to the position of Vice Premier of the State Council in 1984, he continued to maintain that pollution abatement was too expensive to become a crucial element of China's environmental protection strategy. In that speech to the Second National

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[504] Gargan, Edward. 1988. "China Affirms Li Peng as Prime Minister," *New York Times*, 15 April, https://www.nytimes. com/1988/04/10/world/china-affirms-li-peng-as-prime-minister.html. Accessed 23 June 2019. See also Chapter 4.
[505] Economy 2010, 222.
[506] Li Peng 1982, 5.
[507] Ibid.
[508] Li Peng 1983a, 1983b.

Environmental Protection Conference in Beijing, he insisted that China could ill-afford investing in pollution prevention technology. In an article summarising that speech by Cheng Zhenhua 程振华, who was the Chief Engineer of the Ministry of Urban and Rural Construction and Environmental Protection, Cheng revealed comments that had been withheld from Li Peng's officially-released speech. In particular, Cheng noted that Li raised with the conference delegates the argument that 'our pollution control must be compatible with our country's economic conditions and development level, and we cannot afford to spend large amounts of money on pollution control'.[509] Overall, Li's speech demonstrated that economic considerations predominantly influenced how he still saw the range of feasible solutions to environmental pollution, even though he considered environmental issues important.

Furthermore, Li was reported to have stated in his speech to the 1985 National Urban Environmental Protection Working Conference, that 'it was impossible for China to spend significant amounts of money on environmental protection', although if 'environmental management was done well' then it would reduce the amount of money spent on environmental protection. It would have the effect of reducing money spent and achieving better environmental management outcomes:

> For example, some capitalist developed countries, in the prevention and control of atmospheric pollution, require not only the control of total soot emissions but also the control of emissions from sulphur dioxide and other harmful pollutants. This [investment] requires lots of money. We can only control soot emissions. Of course, we also need to control sulphur dioxide and other harmful pollutants. However, for economic reasons, these standards cannot become too excessive. Therefore, we, on the one hand, will persist with the three benefits (三个效益), but also at the same time acknowledge our national circumstances and not consider excessively high requirements which do not conform to those conditions.[510]

As Li's statements show, during the early to mid 1980s economic objectives dominated ecological considerations within the Chinese Communist Party. He did recognise that China's power plant expansion was creating higher levels of soot and sulphur dioxide emissions, but the technology was seen as too expensive given China's then stage of development. Li Peng would promote the adoption of advanced technology in other articles and speeches, but he kept his focus on technology that boosted economic production through enhanced industrial and agricultural output measures.[511] He still saw economic and environmental concerns as mutually exclusive. These twin rationalities had yet to converge at the highest levels of China's political leadership. However, as the next section will demonstrate, despite Li's economic policy

[509] Quoted in Cheng Zhenhua 1984, 3.
[510] Quoted in "Zai quanguo chengshi..." 1985, 2.
[511] Li Peng 1985b.

mindset, by the mid-1980s, an increasing number of Chinese environmental officials were realising that environmental management measures alone could not stem the rising pollution caused by rapid economic development.

The institutional turn towards pollution-prevention technology. The realisation that environmental management was ill-equipped to prevent China's mounting industrial pollution gathered momentum in the mid-1980s. A 1986 speech by Qu Geping reviewing China's environmental protection work over the previous five-year plan provides an example of this realisation. Qu's speech revealed that he and his colleagues had made significant advancements with environmental protection work over that period through closing down or relocating factories.[512] There had been much progress concerning environmental reform, and Chinese officials had acknowledged the importance of the 'polluter pays principle' (谁污染谁治理).[513] However, Qu Geping also realised that there was only so much that environmental management had achieved:

> Environmental management needs strengthening. During the "Sixth Five-Year Plan", progress has been made in environmental management. But, overall, China's management of the environment is only beginning, and there are many problems still to be solved. First, the construction of the environmental legal system is still imperfect. There are still practical problems with no laws or rules to follow. Second, environmental planning work is very weak, there is no practical five-year plan, and environmental planning in many places has not been incorporated into the national economic and social development plans, and the work is blind. Third, the environmental management organisations have not yet formed a complete management system from the central government to the province, city, county and township. Environmental management agencies in many places have not yet become a robust supervisory authority of the government, and it is difficult to exercise the functions of planning, coordination, supervision, and guidance. Fourth, the funding channels for environmental protection are not yet smooth, and the sources of environmental protection funds are still challenging, affecting the progress of environmental governance.[514]

Although Qu Geping's comments reflect the view that the Chinese government had to strengthen environmental management, his enumerated list of weaknesses also indicates his critical view of the effectiveness of environmental management as a universal goal of China's environmental policy agenda. Although his comments were not as pointed as those of the contemporary China watchers canvassed in Chapter Two, they still highlighted many of the institutional flaws surrounding environmental management in China.

This point emerges more clearly when viewed in conjunction with his policy discourse on the decisive role that technology could play in an ecological restructuring of industry. The view

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[512] Qu Geping 1986, 4.
[513] See, for example, Li Peng 1985b; Qu Geping 1986.
[514] Qu Geping 1986, 4-5.

that pollution abatement technology could answer China's pollution problem started to surface in the 1980s before Li Peng entered the environmental protection sector. Qu Geping was again the prominent official who advocated for the increased adoption of this type of technology. In one of his earliest policy commentaries, Qu argued that such technology should serve as a critical element in any strategy to limit or prevent industrial pollution. He drew his inspiration from the experience of Western countries. In many of his early publications, he stressed that China should learn from Western countries and how they responded to environmental pollution because, although they had experienced severe ecological damage, especially during the 1960s, 'from the 1970s their situation had improved significantly'.[515]

In the 1980 essay cited above, Qu drew on the experience of Japan and other Western countries to maintain that technology, while initially expensive, would pay off in the long term. This 1980 essay also claimed that the dominant arguments that China's superior socialist system had a light environmental impact was 'inconsistent with reality' because economic planners had 'only considered direct economic impacts, regardless of long-term ecological consequences'.[516] Qu had recently returned from his appointment to the UNEP in Kenya, and his articles and speeches suggest that he had become convinced that Western 'capitalist nations' should be viewed as a policy lodestar for China rather than an ideological adversary. He argued that the reduction in their pollution was a result of 'strict environmental laws, regulations, high environmental taxes and fines, and labour costs'.[517] Because of these strict measures, industries were forced to 'vigorously promote technological innovation processes, thereby improving the environment, saving raw materials, and power and improving overall production efficiency'. Their experience of better regulations and pollution-prevention technology 'provided an example for China to emulate'.[518] Although his remarks ostensibly appear similar to the command-and-control mindset, his remarks show evidence of ecological modernisation views. Qu believed that these strict policies could synthesise environmental

[515] Qu Geping 1980a, 5. See also Qu Geping 1980b.
[516] Qu Geping 1980a, 4.
[517] Ibid, 5.
[518] Ibid, 5-6.

protection and profit within China's enterprises just like they had in Western countries and Japan.

To support this overtly ecological modernisation view, Qu detailed how Japan had 'spent the equivalent of 19 billion yuan in managing pollution and improving its environment'.[519] He acknowledged that replicating Japan's strategy would involve 'spending comparatively large amounts of money', but – unlike Li Peng – he believed that the experience of Japan and other countries had demonstrated that environmental protection was worthwhile for the economy. In China, the 'economic benefits' of environmental protection 'would accumulate and be displayed more clearly over a short period'.[520] Qu maintained this view concerning the economic benefits of pollution-prevention technology for developing nations in a 1981 article published in *Environmental Protection***.** He sought to make the case that developing nations, such as China, should invest in such technology, noting that the UNEP's technology policies took into account the 'economic, social and environmental benefits' and could benefit not just the developed 'Western nations', but also 'developing nations as well'.[521] With these remarks, Qu was demonstrating his early ecological modernisation credentials, viewing technology as the means to reduce the environmental impact of industrial development. He believed that for China to combat industrial pollution, it needed to borrow ideas from Western nations that had successfully and cost-effectively implemented pollution abatement through clean technology. Moreover, he believed that the ecological restructuring of Chinese industry presented a 'win-win' choice for China as a developing nation, one which would yield improved economic productivity and an 'improved environment'.[522]

Qu's career progression since the 1970s provides a useful context to understand why he became one of the earliest senior Chinese officials to see the benefits of pollution prevention technology. His role as the Chinese delegate to the UNEP exposed him to many of the leading-edge technologies and ideas emanating from advanced Western nations. During this period, many international organisations, such as the UNEP, started to examine ecological

[519] Qu Geping 1980a, 4.
[520] Ibid, 5.
[521] Qu Geping 1981a, 3.
[522] Ibid, 3.

modernisation solutions.[523] For example, in 1980, the UNEP provided financial and technical assistance to the International Union of Conservation of Nature and Natural Resource's landmark report *World Conservation Strategy: Living Resource Conservation for Sustainable Development*, introducing the notion of sustainable development and the call for the increased adoption of cleaner technology.[524] This report would provide the conceptual basis for the 1987 Brundtland Commission's report *Our Common Future.* Qu's comments show that he also saw clean technology as the path on which to achieve the 'three benefits' and reconcile economic and ecological rationalities, an idea close to Brundtland's notion of 'sustainable development'.

Even though Qu initially professed these views, he would conform with Li Peng's views towards technology once the latter became the inaugural chairman of the National Environmental Protection Commission in 1984, illustrating the relative dominance of the latter's position in Chinese environmental policymaking. The consensus position as outlined above was that while 'technological transformation' (技术改造) was commendable, the widespread adoption of clean technology would need to be postponed until China's economy reached 'appropriate national conditions'.[525] Therefore, Qu would only obliquely raise the benefits of technology without going into detail or recommending policy. Instead, he deferred to the view that environmental management through environmental impact assessments (i.e. the 'three simultaneous' 三同时) or discharge limits and controls should constitute the bulk of environmental protection measures. These measures would provide better outcomes for the environment and 'spend little amounts of money'.[526] This view influenced critical environmental legislation. For example, the *Law of the PRC on the Prevention and Control of Air Pollution* passed in 1987 did not address the contribution of coal-fired power plants to air pollution, the broad and extensive problems caused by acid rain, or specific measures to combat rising sulphur dioxide emissions.[527]

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[523] Jänicke and Jacob 2006.
[524] IUCN 1980.
[525] Qu Geping 1987a, 7.
[526] Ibid.
[527] 1987. "Zhonghua renmin gongheguo daqi wuran fangzhi fa" (Law of the People's Republic of China on the prevention and control of air pollution), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Gid=3468. Accessed 29 June 2018.

Despite Li Peng's economic rationalist perspective towards environmental reform, by the turn of the decade, a concern for pollution, especially air pollution, was increasing within China's policymaking circles.[528] This concern would soon challenge the ingrained view that pollution control technology was too expensive. Qu Geping would again lead these arguments in his new position as director of the SEPB. He gave an important speech at the China Power Industry and Environmental Protection Working Conference in 1991 in Beijing, using this platform to make a case for technology to play a critical role in combating China's growing air pollution problem. The significance of his comments can be seen in the language he used to describe this, as well as the forum in which he delivered his speech. This conference was the first to discuss environmental issues caused by the coal-fired power industry. Qu revealed in his speech that throughout the 1980s many officials had remained oblivious to, or disparaging of, the threat presented by air pollution, claiming that it was a 'myth' (神话).[529] Drawing on the experiences of Canada, the United States, and Western Europe, he noted how acid rain from coal-fired power plants had 'killed' (死亡) national forests, as well as acidified lakes and soil. Qu also mentioned a visit he had made to a Swedish lake which was 'a clear lake without any living creatures' because of acid deposition created by coal-fired power plants across Western Europe.[530] He also noted that:

> Ten years ago, when China discussed acid rain, it was like discussing a myth. Now it has become such a significant issue because of the harm caused by acid rain. According to estimates, in several parts of the Southwest [of China], 10 per cent of agricultural production has been reduced, there has been a loss of $2.4 billion [yuan] plus indirect annual losses of 10.4 billion yuan. In the United States and the West, acid rain problems have been brought somewhat under control. In contrast, China's development needs to invoke a high degree of attention [towards this issue].[531]

Qu's speech denotes a significant shift from his previous acquiescence to Li Peng's views; namely that China should focus more on environmental management than pollution prevention equipment. He did acknowledge that China was 'still a poor country', there were 'many things to do urgently', and it might seem 'optimal not to spend large amounts of money' on technology to reduce pollution. He drew on the example of Luo Huang Power Plant in Guangxi Province and its investment of $US40 million for desulphurisation equipment to show that this type of

[528] Qu Geping 1988; "1989 nian Zhongguo…" 1990.
[529] Qu Geping 1991, 8.
[530] Ibid, 6.
[531] Ibid, 8.

expenditure did involve 'large sums of money'.[532] However, Qu argued that such investment was crucial. He said acid rain in China had become 'more serious', and its 'damage was comparatively extensive', and that China needed to invest in power plant technologies such as flue gas desulphurisation (FGD) in order to reduce its increasing sulphur dioxide emissions.[533]

Whether intentionally or inadvertently, Qu's comments seemed aimed at blunting past economic arguments from senior officials, such as Li Peng, who had argued that technology was too expensive for China at its present stage of development. Notably, Qu turned to the potential economic policy instrument of a sulphur dioxide emissions fee to accumulate the funds needed to invest in FGD technology. He forecast that if the Chinese government levied a two-yuan tax (about 37 US cents in 1991) on each tonne of coal consumed then it would raise 'over 2 billion yuan' (or $US 375 million in 1991) each year. This sum could help fund the costs of such technology: 'if this money was placed into an acid rain fund, then managing sulphur dioxide would achieve comparatively good outcomes'.[534] In the year following the conference, the State Council would approve a 'sulphur dioxide emission fee pilot programme'. Three years later, the NPC would pass an updated revision to the *Law of the PRC on the Prevention and Control of Air Pollution* that included FGD within 'control zones' (控区) to curb sulphur dioxide.[535] Such measures show that the Chinese government's outlook on technological strategies was beginning to change towards ecological modernisation-based policies and legislation.

The zeitgeist surrounding Qu Geping's remarks was the global shift towards the idea of 'sustainable development' (可持续发展), popularised by the Brundtland Commission in 1987. By 1991, Chinese officials were preparing for the United Nations Conference on Environment and Development in Rio de Janeiro to be held in June 1992. In the lead up to this, the State Council released *Ten Countermeasures for China's Environment and Development.* Within

[532] Ibid, 10.
[533] Ibid.
[534] Ibid, 10-11.
[535] 1995. "Zhonghua renmin gongheguo daqi wuran fangzhi fa (95 nian xiuzheng)" (Law of the People's Republic of China on the prevention and control of air pollution (95 amendment)), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Gid= 12676. Accessed 29 June 2018.

this policy, the State Council used the concept of sustainable development for the first time in order to harmonise China's developmental ambitions and environmental responsibilities:

> At present, China's economic development still basically follows the traditional development model characterised by massive consumption of resources and extensive management. This model will not only cause considerable damage to the environment but also make development itself challenging to last. Therefore, changing the development strategy and taking the road of sustainable development are the correct choices to accelerate China's economic development and solve environmental problems.[536]

This policy also embraced technology and the environment in a new discursive framework which suggested that Qu's time to successfully promote ecological modernisation ideas had finally arrived. The State Council conceded that 'outdated industrial equipment and backward technology were the main reasons' that pollution and environmental degradation was growing. For any new plants, 'the starting technical level needed to be high'.[537] The Chinese government went to the Rio Conference with an established consensus that technology was a means to achieve sustainable development. After the three-day Earth Summit, the Chinese government signed the non-binding action plan for sustainable development known as *Agenda 21*.[538] Then, a year later, China released its *China's Agenda 21* strategy that positioned technology as a crucial element of sustainable development (see Chapter Two).

The lead government official who both designed and implemented *China's Agenda 21* was the former missile scientist Song Jian 宋健. He was the chairman of both the National Environmental Protection Commission (a position he inherited from Li Peng) and the State Science and Technology Commission (SSTC).[539] In a 1995 article in *China Resources, Population and Environment*, which detailed China's sustainable development strategy, Song conveyed how he viewed the relationship between technology and environmental protection. In particular, he boasted that China:

> now possesses more advanced scientific and technological management methods. For example, some new desulphurisation technologies, which have already been used or are being developed at home and abroad, are much cheaper than initial investment placed in conventional desulphurisation technologies and equipment, and they do not produce secondary pollution. High-tech, advanced and applicable technologies can do much to build a new generation of environmental protection industries. For example, biotechnology, new material technology, new energy technology, and digital information technology can all play a significant role in different spheres and industries. This leapfrogging development… will bring into play the role of science and technology as a primary productivity function. As long as we stick to this direction, it is possible to narrow the gap between us and the developed countries considerably.[540]

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[536] "Woguo huanjing yu…" 1992, 3.
[537] Ibid.
[538] Bradbury and Kirkby 1996, 97.
[539] Chinese name is 国家科学技术委员会.
[540] Song Jian 1995, 3.

Song's comments reflect an ecological modernisation approach to China's future development. Firstly, he saw technological innovation, such as 'new desulphurisation technologies' and other 'new energy technologies', as critical elements in raising the productivity of China's enterprises across multiple industries in a manner that would protect, rather than degrade, the environment. Moreover, he saw such technological innovation as feasible because China would leverage, or 'leapfrog' (跳跃), off the technologically-advanced nations. This optimism in technological leapfrogging would provide an essential element for ecological modernisation policy concepts such as 'cleaner production' and 'circular economy', providing the hope that technological progress would facilitate economic development along with environmental protection (see later section and Chapter Six).

So far, this chapter has charted how China's ecological rationality had progressed significantly ever since Zhou Enlai during the Maoist era had steered the Chinese government increasingly towards incorporating environmental issues into the policy agenda. By 1992, several transitions had occurred that would have far-reaching effects on how Chinese officials viewed the impact of economic development on the environment. Firstly, Chinese officials, led by Qu Geping, increasingly saw technology as a viable means to reduce the ecological impact of industrial development. Secondly, while Li Peng in the 1980s had argued that pollution-prevention technology placed a substantial budgetary burden on the government and enterprises, by the early 1990s the prevailing view held that technology must serve as a critical element in reducing environmental damage from industrial activity. This change in position is evidenced by the State Council's *Ten Countermeasures for Environment and Development* and the State Planning Commission and SSTC's *China's Agenda 21*. With the formulation of its Agenda 21 strategy, the Chinese government bound its officials within the strictures of sustainable development such that policymakers were obliged to formulate sustainable development strategies. No longer would the sole pursuit of economic objectives inherent within 'traditional development' (传统发展) remain a dominant policy position.[541] This progress within the environmental sphere soon intersected with another crucial development in the early 1990s: China's reaffirming further market reforms after a period of 'retrenchment' in the aftermath of the Tiananmen Square incident (see Chapter Four). The question for China's officials in the early 1990s became how they could continue with their market reforms in a

[541] Zou Jiahua 1994, 1.

manner that conformed with sustainable development. Their initial answer to that question was 'cleaner production' (清洁生产). That answer, as the rest of this chapter argues, constituted China's first ecological modernisation policy concept.

The 'Cleaner Production' Policy Debate in China

Conceptual origins of cleaner production. Before discussing the origins and evolution of 'cleaner production' in China, this section provides a brief history of the concept and how it relates to the discourse of ecological modernisation. The idea of cleaner production originates from industry and policy discussions outside China during the late 1980s. Support for cleaner production gained momentum internationally due to a series of 'high level' UNEP workshops in the late 1980s. These workshops acted as 'industry's response' to the World Commission on Environment and Development's report, *Our Common Future,* that called for 'sustainable development' in the late 1980s.[542] With the international community working towards the 1992 United Nations environmental summit in Rio de Janeiro, industry needed to provide technological solutions which allowed commercial operations to continue only so long as they integrated an understanding of ecological limits. The position that economic goals outweighed a healthy functioning biosphere was no longer acceptable. Cleaner production leveraged off the notion that 'pollution prevention pays' (or 3P). Key industrial giants such as 3M propagated the view that companies could eliminate or drastically curtail pollution within the production process profitably if they used clean technological processes.[543] The view was that beyond the environment, cleaner production would also achieve economic efficiency because it would use resources more efficiently and consume fewer inputs. With the aid of input from policy experts and engineers, as well as a series of UNEP workshops, the UNEP formulated a definition of cleaner production in the lead up to the Rio de Janeiro United Nations conference. This definition has remained similar to standard contemporary definitions of cleaner production: namely, that 'cleaner production is the continuous application of an integrated preventive environmental strategy applied to processes, products and services to increase overall efficiency, and reduce risks to humans and the environment'.[544]

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[542] Jackson 2002, 37-38; Herrera-Mendoza et al. 2017, 3324.
[543] Gavrilescu 2004, 49.
[544] Quoted in UNEP. 2006. "Environmental Agreements and Cleaner Production: Questions and Answers," http://www.unep.fr/shared/publications/pdf/DTIx0833xPA-EnvAgreementsEN.pdf. Accessed 17 February 2018, 3.

While the UNEP workshops defined cleaner production, the Rio Earth Summit enshrined cleaner production within the United Nations' non-binding action plan for sustainable development: *Agenda 21.* The concept became an essential element of sustainable development strategies worldwide. In particular, Chapter 30 of the United Nation's *Agenda 21* stated that:

> Through more efficient production processes, preventive strategies, *cleaner production technologies* [emphasis added] and procedures throughout the product life cycle, hence minimising or avoiding wastes, the policies and operations of business and industry, including transnational corporations, can play a significant role in reducing impacts on resource use and the environment. Technological innovations, development, applications, transfer and the more general aspects of partnership and cooperation are to a considerable extent within the province of business and industry.[545]

With this statement, the global community collectively understood technology as an integral element of cleaner production. The Rio signatories also agreed that technology would become the panacea for economic development as well as past environmental degradation and pollution. In the wake of the United Nations conference, the European Commission, the United Nations Industrial Development Organisation and the World Bank further popularised the concept in a series of publications and conferences.[546] The seductiveness of cleaner production, and therefore its ongoing appeal, has been its promise of a potential 'zero emissions' future where continued economic growth and wellbeing would be decoupled from industrial waste. These characteristics have garnered the attention of ecological modernisation theorists who have discussed cleaner production technology within their discussion of 'ecological modernisation'.[547]

It is these aspects of the concept that demonstrate its discursive compatibility with ecological modernisation. The internalising of environmentally sustainable notions within industry offered the pathway to sustainable development. Therefore, rather than reduce production and economic growth until pollution fell within ecological limits, capitalist economies could continue along an ecologically informed, but business-as-usual, trajectory. It was these attractive qualities that would also appeal to China's environmental policymakers such as Qu Geping who had experience working with, and had linkages with, the global environmental epistemic community.

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[545] See Section 30.2 in UNCED. 1992. "Agenda 21: United Nations Conference on Environment & Development Rio de Janerio, Brazil, 3 to 14 June 1992," United Nations Sustainable Development, https://sustainabledevelopment.un.org/content/documents/ Agenda21.pdf. Accessed 11 May 2018.
[546] Ashford 1994, 22.
[547] Mol and Sonnenfeld 2000; Sonnenfeld 2000.

Chinese environmental bureaucrats and cleaner production. The discussion of cleaner production in China emerged out of the growing ecological rationality towards pollutants and resource use and the view that technology could mitigate the seemingly inevitable creation of pollution. As the discussion within China's policymaking circles started to favour technological investment at the start of the 1990s, the idea that China's industry should adopt 'clean technology' (清洁工艺) began to become more prominent within China's science and environmental policy journals.[548] Policy discussion soon emerged from China's SEPB, led then by Qu Geping, whose policy research departments focused on formulating environmental policies that acted in harmony with China's economic development objectives.

Researchers from the SEPB called for the government to move away from 'traditional development' to adopting cleaner production as its core environmental protection strategy. Cao Fengzhong 曹凤中 and his colleagues from the SEPB wrote influential articles concerning possible policy measures to 'encourage clean technologies in China' to cope with its severe environmental pollution.[549] In a 1991 article, Cao conceded the strength in adopting the 'penalty' (罚) measures (ie. command-and-control measures) in its environmental management. However, he said that currently China's industrial enterprises were little more than 'passive managers of pollution' (被动治污), and their passivity towards pollution control needed to shift.[550] Cao evaluated examples of tax exemptions, subsidies, and low-interest loans from abroad to try and find the best measure to move Chinese polluters away from the mindset of 'I am required to manage pollution' (要我治污) to 'I want to manage pollution' (我要治污). With the use of 'rewards' (奖) rather than fines, Cao argued that China's enterprises would become 'voluntary managers of pollution' (主动治污). Moreover, state subsidies to 'encourage' (鼓励) the adoption of cleaner production technology made economic sense in his opinion. He believed that although in the beginning there would be economic costs, it would reduce spending on environmental management in the long-run, meaning that 'funds would be used more effectively'.[551] Cao closed his article by demonstrating the convergence in economic and ecological rationality and how this guided his support for cleaner technologies:

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[548] Cao Fengzhong 1991, 6; Xi Deli 1993, 29.
[549] Cao Fengzhong, Yan Yuxiang and Liu Xiaochun 1989, 8.
[550] Cao Fengzhong 1991, 6.
[551] Ibid.

> Establishing an environmental protection incentive mechanism would promote enterprises to carry out environmental pollution control work actively, reduce the emission of harmful substances, turn harm into profit, turn waste into treasure, open up new ways for industrial raw materials and material sources, and bring profits to enterprises. It also brings vitality [to the economy]. Establishing an environmental protection incentive mechanism can promote enterprises to actively rely on the advancement of science and technology, reform and eliminate backward technologies, adopt advanced technologies, implement clean processes, make full use of resources and energy, and maximise the elimination of pollution in the production process.[552]

Cao's article expressed an the ecological modernisation interpretation of China's future environmental protection. He believed that, through offering incentives, the government would facilitate the broader use of pollution-abatement technology. Policy incentives would also allow Chinese enterprises to make a profit, thus hopefully removing their hitherto passive stance towards pollution control. Cleaner production's focus on profit thus dovetailed with China's path to a socialist market economy. His comments therefore implicitly reflected the view that Chinese authorities needed to hasten the development of ecological modernisation through the use of such policy instruments.

Unsurprisingly, considering SEPB researchers were under his leadership, Qu Geping became the first senior official to openly advocate cleaner production. From the early 1990s onwards, he reiterated the view that Chinese investment in technology designed to reduce or eliminate industrial waste was 'far from enough' (远远不够), especially when taking into account the extraordinary growth that China's industry experienced across the 1980s. China needed to 'vigorously promote and utilise all kinds of new technologies, processes and equipment that were free from waste'.[553] Qu began advocating for 'cleaner production' after he had left the SEPB to become the vice-chairman of the NPC Environment and Resource Protection Committee.[554] In his new position, Qu oversaw the review of legislation that touched on environmental matters in China, strengthening his influence over China's environmental policy in a direction that conformed with an ecological modernisation perspective.

Indeed, once Qu was in his new position, he published an essay calling for the introduction of cleaner production into the policy agenda of the Chinese government. His article conveyed

[552] Ibid, 10.
[553] Qu Geping 1992, 5.
[554] Qu Geping 1994a.

the criticism of China's economic development that had characterised his environmental policy discourse of the 1980s. Qu stated that 'China's environmental conditions' were similar to those experienced by developed countries in the 1960s. Once China started to 'accelerate [its] industrialisation and urbanisation', its environmental pollution 'would reach an unacceptable level'.[555] However, Qu saw hope in cleaner production: 'as long as clean production is placed on the agenda of industrial policy, after a period of hard work, I believe that the industrial environment of our country will undergo tremendous changes'.[556] Although Qu continued his critical stance on China's development, he maintained his earlier optimism of the early 1980s (see earlier section), especially concerning learning from the experience of foreign nations. For China to achieve cleaner production, it needed to 'adopt measures that have proven to be effective…in developed nations'.[557] In a 1994 essay, he again drew attention to external inspiration for cleaner production. He acknowledged how cleaner production emerged from the UNEP conference on preventive environmental management in 1991, as well as the United Nations Industrial Development Organisation and World Bank. For example, he mentioned that these organisations 'had vigorously promoted "clean technology" and "clean production"'.[558]

In another 1994 essay published in the Party journal *Seeking Truth*, Qu further elaborate his ideas on cleaner production. He framed cleaner production within the broader narrative of sustainable development. He described the importance of cleaner production as:

> The fundamental transformation away from traditional models of development. It is the inevitable choice that leads to a new path of industrialisation and to realise sustainable development. Cleaner production is an important measure to increase company competitiveness … source reduction occurs through improved technologies and processes that reduce energy and material consumption, thus reducing pollutant emissions. Since the 1980s, these types of measures in developed countries have had substantial developments and not only have become effective measures to control pollution and improve the environment but also have become a positive pathway to reduce energy consumption and raise economic efficiency.[559]

Even though FGD technology was considered an integral part of China's environmental protection policy, Qu's remarks during this period represent a divergence from simple 'end-of-

[555] Ibid, 2.
[556] Ibid, 4.
[557] Ibid, 2.
[558] Ibid, 3.
[559] Qu Geping 1994b, 27.

pipe management' (末端处理) to focus also on 'source reduction' (源削减).[560] He focused on rising levels of pollution to make his case, reporting that China's enterprises in the 1980s had made great 'efforts' (努力) to reduce pollutants, but even with these efforts the levels of sulphur dioxide, nitrous oxide and hydrocarbons had risen to 'serious' (严重) levels.[561] With pollution levels predicted to experience significant surges as China continued its modernisation, Qu saw cleaner production as the only way that China would be able to handle its rapid economic development in primary industries such as 'steel, electricity, cement, petroleum, coal, transportation and chemicals'. He stated that environmentally-centred investment in these industries would incur costs in the early stage, but those costs would grow even higher as the years progressed unless early action was taken, and in the future the environmental investment costs 'may be higher than originally estimated'.[562] With an optimistic ecological modernisation outlook that emphasised the economic gains that would result from restructuring industry along more sustainable lines, he believed that the improvements in economic efficiency and reduced resource inputs would yield the requisite profits to offset the initial cost of pollution abatement. Therefore, China needed to invest in cleaner production technology immediately and reap the benefits of further economic growth.

This review of Qu's early advocacy for cleaner production reveals how the intersection of his ecological rationality and economic rationality led to the promotion of ecological modernisation ideas. In other words, Qu accepted that China would need to continue its industrial development but that it could do so in a manner that both strengthened environmental protection and increased economic competitiveness. His argument was a return to his views of the early 1980s that developed nations could provide an example for China to follow. This can be interpreted as a measure of the waning economic rationality promoted by Li throughout the 1980s.

Other prominent senior officials joined Qu in support of cleaner production. Song Jian, the chairman of the SSTC and lead author of the *China's Agenda 21* strategy, regarded cleaner production as a necessary means for China to achieve its sustainable development objectives. In a 1994 speech, Song argued that if China did achieve sustainable development, it would

[560] Qu Geping 1994a, 4.
[561] Ibid, 2.
[562] Ibid.

need the 'the widespread promotion and application of environmentally sound technologies and clean production technologies that unified economic development and environmental protection, placing economic development within the interests of protecting resources and the environment'. With sustainable development and the adoption of clean technologies, 'the industrial sector no longer needs to regard resources and environmental protection as a legal burden'.[563] Similar to the comments by Qu Geping and Cao Fengzhong, Song saw 'cleaner production' as an economic opportunity.

Qu Geping's successor at the SEPB, Xie Zhenhua, continued to make a case for cleaner production once Qu had transferred to the NPC's Environment and Resource Protection Committee.[564] For example, in 1996, he referred to 'cleaner production' in an article which explored the best means to 'implement a sustainable development strategy and promote coordinated economic and environmental development'.[565] In this article, he detailed how China's 'economic growth' had so far been supported by a 'traditional planned economic system…that was characterised by high input, high consumption, and high pollution...[with] low economic efficiency and major economic and technical indicators that have lagged far behind developed countries'. However, in this new socialist market economy era, Xie argued that to combat 'worsening environmental pollution' China's traditional modes of production needed to 'transform production' and implement 'a selection of production methods and consumption patterns that were beneficial for conserving resources and protecting the environment' through adopting 'cleaner production'.[566] Xie's comments, coupled with Qu's earlier remarks, demonstrate a reflexive ecological modernisation interpretation of China's development based on market economic rationality. Based on this economic mindset, growing environmental impact was a reason in itself to seek out a balance between economic and environmental objectives using the market rather than traditional command-and-control environmental strategies.

[563] Song Jian 1994, 4.
[564] Xie Zhenhua was raised in Chapter Four concerning dual Party and government appointments.
[565] Xie Zhenhua 1996, 3.
[566] Ibid.

Cleaner production enters the policy agenda. Between 1992 and 1997, cleaner production started to enter China's environmental policy agenda formally and become a concept that was ubiquitous within key policies and legislation.[567] For instance, the 1995 *Law of the PRC on the Prevention and Control of Environmental Pollution by Solid Waste* stated that 'the state encourages and supports the adoption of cleaner production technologies that reduce the generation of solid waste' (discussed further in Chapter Six).[568] The State Council also released the *Resolution on Several Issues Concerning Environmental Protection* in 1996 that emphasised 'the promotion of cleaner production'.[569] Then in 1997, the SEPB released its *Policy Suggestions and Action Plans for the Promotion of Cleaner Production*. This policy provided the most explicit policy position at that time concerning cleaner production. It summarised cleaner production as:

> The use of clean energy and raw materials to produce clean products through a clean production process. Cleaner production continuously applies comprehensive preventative environmental strategies to production processes and products, thereby reducing risks to humans and the environment; it is a necessary means to promote the transformation of economic growth patterns and achieve the goal of total pollutant control.[570]

The policy document also stated that:

> Enterprises are the mainstay of cleaner production. According to the cleaner production goal of "increasing efficiency, reducing consumption, saving energy and reducing pollution" (增效、降耗、节能、减污), enterprises should implement cleaner production in combination with strengthening enterprise management, technological transformation, resource conservation and comprehensive utilisation and establishing a modern enterprise system. They should implement cleaner production as a necessary means to achieve pollutant discharge standards and pollutant emission control indicators.[571]

With this passage, the SEPB expressed the ecological modernisation beliefs that underpinned their support of cleaner production. This ecological modernisation stemmed from a perspective whereby clean technology, enterprise efficiency and the market were the path towards

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[567] Shi 2003, 63-64.
[568] See Article IV in 1995. "Zhonghua renmin gongheguo guti feiwu wuran huanjing fangzhi fa" (Law of the People's Republic of China on the prevention and control of environmental pollution by solid waste), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Gid=13136. Accessed 25 June 2018.
[569] Guowu yuan 1996. "Guowuyuan guanyu huanjing baohu ruogan wenti de jueding" (Resolution of the State Council on several issues concerning environmental protection), Beida fabao, http://en.pkulaw.cn/display.aspx?cgid=02f946b29a37f576bdfb&lib=law. Accessed 28 May 2018.
[570] Guojia huanbao ju. 1997. "Guojia huanbao ju guanyu tuixing qingjie shengchan de ruogan yijian" (Several opinions of the State Environmental Protection Bureau on promoting cleaner production), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid=3bf3537208a838ebbdfb. Accessed 28 May 2018.
[571] Ibid.

sustainable development, rather than solely relying on state control through environmental management as the only means for companies to achieve pollution abatement.

Then, in October 2002, the NPC passed the *Cleaner Production Promotion Law* to 'improve the efficiency of resource utilisation, reduce and avoid pollutant generation, protect and improve the environment, safeguard human health, and promote sustainable economic and social development'.[572] The law addressed 'encouragement measures' such as government subsidies, low-interest loans, and tax exemptions or reduction, as well as 'legal liabilities' such as fines for companies that ignore cleaner production regulations, for example non-compliance of auditing and information disclosure.[573] Although it is beyond the scope of this thesis to critique the reality of cleaner production in China, analysts have noted that 'many barriers exist in China's CP [cleaner production] promotion procedure, such as the lack of co-benefit calculation demonstration, low awareness and misconception of CP, inadequate institutional framework, constraints in technological facilities and financial support, limited market of CP services, internal conflicts of implementing agencies, and so on'.[574] Nonetheless, the fact that Chinese authorities further revised the cleaner production law in 2012 to integrate objectives of 'energy consumption' reductions suggests that the ecological modernisation concept was becoming entrenched within China's environmental policy discourse.[575]

Cleaner production, ecological modernisation and China's economic bureaucracy. To leave the discussion of cleaner production at the promulgation of the eponymously titled law would neglect an essential aspect of the early ecological modernisation story in China: the discursive expansion of ecological modernisation ideas to include economic sectors of the Chinese government. Thus far, this chapter has shown that the majority of commentary concerning environmental reform stemmed from senior environmental bureaucrats such as Qu Geping and researchers under his supervision at the SEPB. Therefore, the inclusion of the

[572] See Article I in 2002. "Zhonghua renmin gongheguo qingjie shengchan cujin fa" (Law of the People's Republic of China on promoting cleaner production), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Gid=40272. Accessed 28 May 2018.
[573] Mol and Liu 2005, 8.
[574] Hicks and Dietmar 2007, 395. See also Fang and Côté. 2005.
[575] 2012. "Zhonghua renmin gongheguo qingjie shengchan cujin fa (2012 xiuzheng)" (Law of the People's Republic of China on promoting cleaner production (2012 amendment)), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Gid=168382. Accessed 18 May 2018; Guan, Grunow and Yu 2014.

concept by the research institutes of the developmentally-oriented State Planning Commission (SPC) and Chinese Academy of Sciences in the mid-1990s marked a significant development in the evolution of ecological modernisation ideas.[576] For example, Sun Honglie 孙鸿烈 in his position as a policy researcher from the joint SPC-China Academy of Science Committee for the Comprehensive Survey of Natural Resources[577] argued that cleaner production was the 'key' (关键) to combatting environmental pollution. In his opinion, China's enterprises needed to 'utilise clean technology, rather than relying on end-of-pipe technology' if they were to arrest the growing pollution problem caused by China's rapid 'urbanisation and industrialisation'.[578] He stressed that TVEs largely contributed to the vast bulk of industrial pollution. Although TVEs had 'solved the rural labour surplus problem' and contributed to 'one-third of China's economic output', their pollution, if ignored, would result in 'unimaginable consequences'. Sun noted that because of TVE's smaller economies of scale, they 'lacked the capacity to build end-of-pipe processing facilities'. Therefore, more scientific research was needed to find 'clean production technological systems suitable for small-scale…TVEs'.[579] Moreover, because these small TVEs could not undertake innovative scientific research, the government needed to step in and provide that investment. Sun's paper shows how even developmental agencies now saw the merits of cleaner production technology and how ecological modernisation discourse was influencing even the government's economic organs.

The involvement of economic agencies in environmental policy further progressed after a major administrative reshuffle of government departments in late 1997. The State Council created the State Economic Trade Commission (SETC), entrusting it with taking the lead in finalising cleaner production legislation. The State Council created the SETC out of the old SPC with the other functions of the SPC transferred to the newly established State Development Planning Commission (SDPC).[580] This move, as noted above, would have far-reaching effects on the ongoing incorporation of ecological modernisation solutions within

[576] Sun Honglie 1995.
[577] Chinese name is 自然资源综合考察委员会综合考察.
[578] Sun Honglie 1995, 200.
[579] Ibid.
[580] "Guojia fazhan jihua…" 1998.

China's environmental policy agenda. As scholars have previously noted, economic agencies traditionally had more bureaucratic clout than environmental protection agencies such as the SEPB, even granted that the latter's bureaucratic level was also upgraded to that of an 'administration' (总局) in the 1998 reshuffle.[581]

This strengthening clout was revealed in comments by the inaugural deputy director of the SETC, Li Rongrong, in an article for *China Population, Resources and Environment*.[582] Li was a chemical engineer who graduated from Tianjin University just before the Cultural Revolution commenced. From 1968, he worked in a chemical factory in Jiangsu, rising from a factory worker to the head of the factory. In 1986, he transferred into policymaking, taking up a series of economic policy leadership positions in Wuxi, Jiangsu Province before being promoted to the role of deputy director of the Department of Foreign Economic Cooperation in the State Council's Economic and Trade Office[583]. He transferred to other economic reform departments within the government before taking up his position as deputy director of the SETC in 1997.[584] Despite his rise through economic channels, Li showed enthusiasm for cleaner production, noting that it would allow China to achieve both 'environmental and economic benefits' and that it held 'the key to preventing industrial pollution' in addition to being 'an important measure to achieve coordinated development of the environment and economy'.[585] In 1999, Li helped oversee the SETC's Cleaner Production Demonstration Projects Beijing, Shanghai, Tianjin, Chongqing, Shenyang, Taiyuan, Jinan, Kunming, Lanzhou and Fuyang across the petrochemical, smelting, chemical engineering, light manufacturing and shipping industries.[586]

Comments by Li in a 2003 article once he became the first director of the State-owned Assets Supervision and Administration Commission further illustrate how the developmental side of China's bureaucracy had incorporated cleaner production, and thus ecological modernisation ideas, into their developmental thinking. SASAC, as explained in Chapter Three, was the bureaucratic agency created by the State Council in 2003 to oversee China's

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[581] Economy 2010, 7; Shi and Zhang 2006.
[582] Li Rongrong 1997. Li Rongrong was mentioned in Chapter Four concerning SOE reforms.
[583] Chinese name is 国务院经济贸易办公室.
[584] Renmin wang. 2003. "Li Rongrong tongzhi jianli" (Comrade Li Rongrong's resume), 4 July, http://www.people.com.cn/GB/shizheng/252/9667/9683/20021127/875814.html. Accessed 23 June 2019.
[585] Li Rongrong 1997, 11.
[586] Shi 2003, 64.

SOEs as they underwent further reform to the 'modern enterprise system' (现代企业制度). Li remarked how 'cleaner production was a new policy prevention strategy that has been introduced in order to overcome the environmental abuse of end of pipe management'.[587] Li's other remarks in the article deserve to be included in full because they also convey how China's developmental bureaucracy had incorporated the idea of cleaner production within an ecological modernisation framework that intertwined economic and environmental benefits. He remarked that:

> the implementation of cleaner production is a necessary transformative path that takes industrial pollution from simple end-of-pipe management to preventive pollution. Traditional end-of-pipe management and production processes are divorced from "pollute first, clean up later" (先污染后治理) to instead be based on "management" (治). From the source, cleaner production is implementing production process controls and reducing or eliminating the production of pollutants to be instead based on "prevention" (防). With traditional end-of-pipe management, the investment is costly, the management is difficult, and the operating costs are high. Moreover, environmental benefits and economic benefits are not integrated, with companies lacking the enthusiasm for preventing pollution. Cleaner production maximises the use of resources and eliminates contaminants in the production process. Thus it not only radically improves environmental conditions, but it also reduces energy, raw materials and production costs, improves economic efficiency, and achieves "a win-win situation" (双赢) for the economy and environment. The most significant difference between clean production and traditional end-of-pipe management is finding that juncture between environmental and economic benefits capable of encouraging companies to adjust to prevent pollution.[588]

Li's remarks align with many of the ecological modernisation ideas drawn from literature in Chapter Two: technology, economic benefits, win-win outcomes, and new modes of development. By injecting a business perspective into the rationale behind cleaner production, he was also able to promote the benefits of the concept to a broader audience, outside the environmental policy portfolios.

Li was not the only economic official who advocated for cleaner production methods. For instance, the new minister of the National Development Reform Commission (NDRC), Ma Kai 马凯, in discussing the *Cleaner Production Promotion Law*, called for the 'promotion of cleaner production' in a 2003 article.[589] Ma Kai's ideas concerning a circular economy are explored in Chapter Six. The SDPC also weighed in on cleaner production. In a 1999 article, SDPC Chairman Zeng Peiyan 曾培炎 called for the 'strengthening of international cooperation in the field of climate change' that would help 'promote clean production and technological progress as well as facilitate the adjustment of its industrial structure and energy structure'.[590]

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[587] Li Rongrong 2003, 33.
[588] Ibid.
[589] Ma Kai 2003, 2.
[590] Zeng Peiyan 1999, 1-2.

These views concerning cleaner production show that by the beginning of the twenty-first century ecological modernisation beliefs had diffused from the environmental policy sectors of China's government into the economic fields of China's bureaucracy. Finally, these economic stakeholders joined the SEPB and its predecessors to promote 'environmental protection work' (环境保护工作) that conformed with their nascent ecological modernisation beliefs.

Conclusion: The Policy Objective of Cleaner Production in China and Ecological Modernisation

This chapter has charted the development of ecological rationality towards industrial pollution in China. Premier Zhou Enlai understood that China's socialist modernisation was not as harmless as Maoist acolytes believed. Then, from the Reform era onwards, environmental officials led by Qu Geping believed that China should transition towards pollution-prevention technology. Their views were stymied by other more powerful economic officials such as Li Peng who believed, from an economic development perspective, that China could ill-afford expensive technology at the early stages of China's industrialisation. Environmental management, or command-and-control measures, were viewed as more cost-effective for preventing pollution. However, the adoption of a 'socialist market economy' and 'sustainable development' as twin guiding principles for the CCP presented the Party with a 'policy straight jacket'. Any further policies would have to achieve the twin objectives of growing the economy and reducing environmental impact from industrial pollution. The convergence of economic and ecological rationality had arrived for Chinese policymakers. Therefore, with the further loosening of state controls as China embarked upon more market reforms, Chinese officials sought out technology, rather than further environmental management measures, as a critical element of their environmental protection strategy. From this point on, researchers within the SEPB and senior environmental policymakers such as Qu Geping and Xie Zhenhua started to advocate for cleaner production.

Ecological modernisation also emerged in Chinese policy discourse through the arguments for cleaner production and the way in which economic considerations gradually submitted to a steadily evolving ecological rationality amongst China's officials. In the Li Peng era, economic objectives held the ascendency amongst China's elite policymakers, but by the early 1990s, the ecological rationality in China's government grew to the point where it challenged, at least rhetorically, China's economic rationality. This challenge has led to a greater convergence of

economic and ecological rationality within environmental policy reform in China. This convergence is demonstrated by officials from economic departments such as the SETC and SDPC, not just the SEPB, promoting cleaner production. Moreover, the State Council also entrusted the SETC with cleaner production work, demonstrating the importance that it placed on getting 'economic benefits' in synchronicity with 'environmental benefits' and having the economic managers in charge of the direction of key environmental reforms.

The idea of cleaner production in China is based on strong faith in the role that market actors perform in ecological modernisation. Song Jian's comments when promoting the *China's Agenda 21* action plan indicated that he saw cleaner production as a mechanism that would allow China to undertake 'leapfrogging development' and experience boosts in its 'fundamental productivity'. This belief in market actors goes to the crux of China's market reforms, whereby China loosened state control on its enterprises to grow the economy (see Chapter Four). Chinese officials understood in the early 1980s that the main driver of economic growth and prosperity in China, TVEs, also generated large amounts of pollution. Once China's leaders adopted a 'socialist market economy' as one of the new guiding principles at the Third Plenum of the 14th Party Congress in 1993, they also had to reconcile how they would undertake necessary environmental protection work in a manner that would not harm the rapidly growing economy. Upgrading equipment with cleaner technology would allow these TVEs not only to increase their productivity through more efficient operations but also minimise adverse impacts on the environment. The government could assist with upgrading equipment through tax subsidies and exemptions for smaller TVEs with limited resources to undertake research and development for cleaner production. With cleaner production, the government wanted to facilitate the market as a means to protect the environment. The crucial role of the market in cleaner production explains the new position that economic agencies occupied within environmental protection policymaking. The SEPB had played the lead role in environmental protection work up until the mid-1990s, but even with that history the State Council entrusted the SETC to take over the handling of cleaner production legislation and cleaner production demonstration projects.

Lastly, this chapter has also shown how the environmental concern that drives cleaner production has stemmed from the reflective view that 'traditional development' had resulted in significant levels of pollution. This view recognised that pollution would present China with long-term problems if its development continued at its present pace and form. In this way,

cleaner production constitutes a reflexive interpretation of their modernisation, which is another component of an ecological modernisation discourse (see Chapter Three). With this reflexive understanding, the rhetoric used by senior officials illustrates the ecological modernisation path which they see as a solution to China's current adverse environmental circumstances. Rather than treat these adverse environmental circumstances as a reason to de-modernise the economy or even dismantle China's burgeoning market economy, as demodernisationists E.F. Schumacher or neo-Marxists such as Allan Schnaiberg would argue (see Chapter Two), senior officials believed that the only way out of the present environmental predicament was through further (environmentally-centred) modernisation. This reflexivity and the strategies to foster cleaner production suggests that, while the policymakers canvassed in this chapter never used the term 'ecological modernisation' (生态现代化), they sought to manufacture such a process within Chinese industry.

Now this thesis will move on to exploring the concept of the 'circular economy'. Circular economy provides an important environmental reform concept to examine because it materialised near the end of the 1990s while the legislative deliberations on cleaner production were underway within the NPC. An examination of the circular economy debate in China provides the opportunity to compare it to cleaner production to determine its similarities and differences. The following chapter will ask the same questions that framed this chapter: where did the notion of a circular economy come from? Which environmental problems strengthened the rationale for the implementation of a circular economy? Which individuals and institutions promoted a circular economy? In doing this, this thesis will be able not only to examine the extent to which ecological modernisation ideas have influenced China's environmental policy agenda, but also the degree in which these ideas have evolved within that said agenda.

Chapter Six: Circular Economy in China

Chapter Five outlined the evolution of concern in China toward pollution, and how the growing unease over pollution resulted in the enacting of the *Cleaner Production Promotion Law* in 2003. In the wake of growing interest in the concept of sustainable development and *China's Agenda 21,* cleaner production marked a significant milestone for Chinese environmental protection because this policy idea became the first ecological modernisation concept to be incorporated into official Chinese environmental policy discourse. Cleaner production drew on many of the core principles of an ecological modernisation belief system: a reverence for science and technology, a balance of ecological and economic considerations and a belief that cleaner production would promote new economic growth in a mutually reinforcing virtuous circle.

This chapter shifts to a discussion of an environmental reform concept that developed around the same time as cleaner production: 'circular economy' (循环经济). While this chapter will touch on many of the themes discussed in the last chapter (industrial pollution), it focuses more on the policy commentary of officials that drew attention to the environmental impact of population growth, high resource use and growing waste. From that historical foundation, it introduces the intellectual history of circular economy and its academic and policy discussion in China, focusing particularly on the policy discourse that surfaced from officials within the State Environmental Protection Administration (SEPA) and National Development Reform Commission (NDRC). The chapter concludes by arguing that 'circular economy' reveals itself, like cleaner production, as a reform measure that is characterised by ideas of ecological modernisation, namely technological and market optimism.

The Origins of the Circular Economy Policy Discussion in China

Population growth in China and ecological rationality. It is necessary to begin with an examination of the population policy debate in China and how this debate intersected with growing ecological rationality in China in order to understand why the National People's Congress (NPC) incorporated circular economy into China's environmental policy agenda in 2007. As Chapter Two discussed, population growth was considered a positive development in the early years of the Maoist era. However, Chinese authorities, especially under the leadership of Deng Xiaoping, soon realised that unchecked population growth would hinder China's modernisation. After education measures failed to slow the population sufficiently,

from 1978 onwards the Chinese leadership started to consider the idea of a one-child policy to slow China's population growth. In 1979, the *People's Daily* reported that Chen Muhua 陈慕华, the then chairman of the State Council's Family Planning Leading Group[591], stated that moving 'the focus of birth control work to having one child is the best approach'.[592] In 1980, the Chinese leadership instituted the one-child policy that would limit families to one child, with two children allowed only in exceptional circumstances.[593]

The most prominent advocate against continued population growth was Song Jian, the former missile scientist and future chairman of the National Environmental Protection Commission. The previous chapter touched on his ideas concerning cleaner production. Song first publicly raised the spectre of population growth in a 1980 article published in *China Science* jointly with his Chinese Academy of Social Sciences (CASS) colleague You Jingyuan 于景元. Their article presented a series of projections concerning China's population growth and declared that if the birth rate grew from its current level of 2.8 births per woman to 3 births per woman, then China's population would rise to 4 billion by 2050.[594] By the early 1980s, China's population had already reached over one billion people, thus heightening the fear of a 'population explosion' (人口激增).[595] Song argued in an article for the *Guangming Daily* that China's optimal population was between 650 and 700 million.[596] The main reasoning for this population target was influenced by an economic rationality that interpreted uncontrolled population growth as a severe complication for China's socialist modernisation, a key goal of Deng Xiaoping and the Chinese leadership at the time being the creation of a 'modern China'. Song linked population policy to that goal, arguing in a 1981 book that population growth would harm China as it 'pursued the goal of the four modernisations – i.e. agriculture, industry, defence, and science and technology – aiming to build a modern, strong socialist country'.[597] In particular, he stressed that population growth would hinder industrial and agricultural planning.

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[591] Chinese name is 国务院计划生育领导小组.
[592] Feng, Cai and 2013, 119.
[593] Greenhalgh 2005, 253.
[594] Song Jian, Yu Jingyuan and Li Guangyuan 1980, 931.
[595] Xia Weisheng and Tang Zhongkai. 1981. "Shengtai pingheng yu kongzhi renkou zengzhang" (Ecological balance and the control of population growth), Renmin ribao, 2 December. See also Qu Geping 1981b.
[596] Song 1981, 29.
[597] Ibid, 26.

Crucially, for the exploration of ecological modernisation discourse in China, Song Jian went beyond mere economic arguments and made a case for why a large population in China would threaten vital ecosystems, revealing an ecological rationality that saw population growth as an existential threat to China. He stated that, thus far, in order to feed China's population 'virgin land was opened up, and lakes were reclaimed and converted into fields'. These developments were a problem, he argued, because they 'threatened to ultimately destroy the ecosystem which supports human life'. They also failed to take into account the fact that the 'capacity of the land was limited'.[598] Interviews by China scholar Susan Greenhalgh with Song Jian revealed that he was influenced by the Club of Rome's *Limits to Growth* while on a study tour to Europe in the 1970s. Its catastrophist forecasts and quantitative reasoning resonated with Song Jian, who was familiar with its analytical methods because of his cybernetics research.[599] Overall, Song's remarks in the 1980s convey an economic rationality through his interpretation of population growth as a threat to China's reform era modernisation. However, they also suggest an ecological awareness in the sense that a large population in China would provide a destabilising influence on the ecological system that the Chinese people depended upon for their future socio-economic development. As this chapter will reveal, these ideas would form the basis of an ecological understanding that Chinese officials used to advocate for a circular economy nearly two decades later.

Qu Geping carried on the policy discussion started by Song Jian in his position as head of the State Council's Environmental Protection Leading Small Group Office. The last chapter detailed how Qu played an integral role in fostering environmental awareness towards industrial pollution. He would perform a similar role regarding population growth, but due to the fact that economic arguments intertwined with the population debate, he was far from a lone voice in drawing attention to the environmental threat of a burgeoning population (discussed further below). In a series of papers in the early 1980s, he argued for population control because of the cumulative pressures that a large population placed on the environment. For instance, in a 1980 article exploring environmental protection measures and industrial growth, Qu focused on the negative environmental impact of China's burgeoning population:

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[598] Ibid.
[599] Greenhalgh 2003, 170.

> The destruction of natural ecology, the loss of land, and the impoverishment caused by population pressure not only reduce the resource base but also degrade the rural environment. Improper industrialisation not only wastes significant resources and pollutes the environment, but also causes populations to flood cities, creating one of the most severe environmental problems of the contemporary era: the congestion of the city and the deterioration of the environment.[600]

Qu's and Song's comments reflected a new ecological awareness of the environmental disequilibrium caused by China's population growth. In a two-part essay published in *Environmental Protection* in 1981, Qu further argued that population growth negatively impacted the environment to such a large extent that demography and environmental studies needed to become more intertwined, so that China's policymakers could become better equipped to 'formulate correct strategies' to manage this vexed policy issue.[601]

A year later, Qu also argued for the continuation of China's new population control policy, the one-child policy (独生子女政策), which had only been in place for a year. He cautioned that 'letting the population grow uncontrollably was not in the interest of present or future generations' as the 'human environment' would find it difficult to 'accommodate and sustain' that number of people.[602] In part two of his *Environmental Protection* articles on 'population explosions', Qu generally supported Song Jian's optimal population target (or what he termed the 'representative opinions' 代表性的意见) of between 650 and 700 million. He remarked that with China's population set to exceed this target population by '500 million' in 2000, the Chinese government 'should take firm measures to gradually lower the natural growth rate of the population to zero or even negative' even if it took 'hundreds of years of hard work'.[603] Qu's reflections represented a grave concern for the ecological impact of population growth.

The arguments for taking into account the impact of population growth on the environment were also gaining traction with other senior environmental officials. The minister for the Ministry of Urban and Rural Construction and Environmental Protection, Li Ximing 李锡铭, in a 1982 essay for *Environmental Protection*, mirrored many of Qu's points about population and the environment:

> Rapid population and economic growth have exacerbated the consumption and depletion of resources, resulting in the pollution and destruction of the environment. The destruction of the natural ecological

[600] Qu Geping 1980a, 3.
[601] Qu Geping 1981b, 8.
[602] Ibid.
[603] Qu Geping 1981c, 16-17.

> balance and population pressures also has damaged rural environments. Irrational industrial development has caused the population to surge towards cities which also have caused the deterioration of contemporary urban environments.[604]

Here Li touched on the notion of 'ecological balance' (生态平衡) to stress the need for government controls, such as the one-child policy, in order to reduce the imbalance caused by overwhelming population pressures.

Furthermore, Li also exhibited a growing ecological rationality towards the effect that population had on the environment after he had been appointed to the State Council and been made the chairman of the National Environmental Protection Commission. Discussing the 'population issue' (人口问题) in a speech to the Second National Environmental Protection Conference held in Beijing (from December 1983 to January 1984), Li raised the spectre of population growth, saying that it had the potential to cause 'ecological damage' (生态破坏).[605] This was the same speech where he noted that more attention needed to be paid to the 'environmental pollution' (环境污染) caused by China's economic modernisation.[606]

The debate over a circular economy also had regard to one of the economic reasons behind further 'controls' (控制) on population growth: resource usage, specifically the high and inefficient use of energy resources. Senior officials were aware of China's energy insecurity, and how population growth exacerbated that insecurity. In the earlier 1982 article published on China's population explosion, Qu raised the 'impact' (影响) of a growing population on China's energy resources. He noted that although there were many factors explaining why societies experienced 'energy shortages' (能源短缺), the 'pressure from a surging population was an important reason'.[607] These shortages were having a 'major impact on natural resources and the environment' in rural areas. Qu noted that in developing countries:

> Ninety per cent of the trees felled were burnt as fuel. In many areas, trees are cut, plants and straws burnt, and even livestock manure is used as fuel to burn. The burning of manure and straw has aggravated the decline of farmland fertility, reduced food production and made life even more impoverished.[608]

These problems were also witnessed in China because its energy resources 'were also very scarce' if viewed in their 'per capita amounts' (人均量), even if China had considerable

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[604] Li Ximing 1982, 2.
[605] Li Peng 1984, 4.
[606] See Chapter Five.
[607] Qu Geping 1982, 45.
[608] Ibid.

resources of coal and oil. This 'per capita' emphasis heightened the population variable in discussions over resource stocks.

Qu was speaking before China's energy shortages became more prominent from the late 1990s onwards, yet he seemed acutely aware of the future population and energy pressures that would face China. He noted that China could 'vigorously develop and increase coal, oil, natural gas, hydropower, biogas, and fuelwood forests', but due to its 'large investment constraints and long construction period' China would find it difficult to 'overcome energy shortages for a long time'.[609] Given this projection, it was 'necessary to control the growth of the population' to help 'ease energy scarcity'. He pointed out that since 1980, when the government initiated the one-child policy, the natural population growth rate in 1980 had fallen from 19 per cent to 12 per cent, while the population had only increased by 7 million in one year. Qu roughly calculated that this reduction in population growth also reduced the consumption of 6 million tonnes of standard coal.[610] Later sections will show that such economic reasons formed the basis of ecological modernisation justifications for the implementation of a circular economy.

Population growth and the growth of waste. As China underwent its rapid industrialisation and urbanisation, the steady accumulation of solid waste also drew concern from Chinese politicians and officials. It is necessary to discuss this official unease, because such anxiety would lead to calls for a circular economy by senior government officials in both the environmental and economic sections of China's government by the late 1990s.

Early on in the Mao era, senior Party officials were aware that, as well as pollution, China's industrial enterprises were creating too much solid waste. For example, in 1964, Zhou Enlai remarked to an Albanian delegation that 'concerning waste gas and waste material that can be used, attention should be paid to its reuse and full utilisation'.[611] Chinese officials argued that 'comprehensive utilisation' (综合利用) of resources provided the best method to slow the accumulation of waste. Their idea of 'comprehensive utilisation' at the time rested on three elements. The first was to ensure that resources were used for a variety of products. For

[609] Ibid.
[610] Ibid.
[611] Quoted in Li Xiang 2009, 47.

example, researchers at the time argued that beyond thermal coal, raw coal could also be used for 'synthetic rubber, sulphuric acid, synthetic fibre and plastics'.[612] Comprehensive utilisation also extended to increasing the 'utilisation rate' (利用率) of resources such as using wood material not only for the prime lumber but also using wood shavings for wood chipboards and particleboard. Lastly, comprehensive utilisation involved particular industries utilising by-products from other industries. For instance, coal gangue from thermal coal power plants could be used as building material.[613]

Throughout the 1980s Li Peng would make several brief references to solid waste in his speeches[614], but again it was Qu Geping who would become the most vocal critic of solid-waste stockpiles in China, seeing the growing stockpile of waste as a 'serious problem'.[615] Following Zhou, he believed that the problem lay with the implementation of 'comprehensive utilisation'. Although Qu saw the strengths in such a policy, he recognised that its efficacy amounted to little in its present form. In an earlier 1980 article, Qu remarked that even though China gave significant publicity to comprehensive utilisation of the three wastes 'its actual progress was not great'. Comprehensive utilisation in China contained 'no requirements, no indicators, nor any binding elements'.[616] Moreover, he believed that the unsatisfactory progress with comprehensive utilisation stemmed from a significant gap in 'knowledge' (认识) among China's industrial enterprises. The government would need to create 'appropriate economic policies' through 'tax relief, tax exemption and price policy' to engender 'enthusiasm' (积极性) so that these companies could have the required funds to undertake meaningful utilisation of 'waste gas, wastewater, and solid waste as key raw materials'.[617] In this article, Qu was outlining an ecological modernisation vision for waste reduction policies that would form part of the arguments for circular economy close to two decades later (see later section for more detail). He argued that any profits these companies made through these subsidies would be 'used by companies to manage pollution and improve the environment' rather than transferred

[612] Wu Yue 1986, 24.
[613] Ibid, 24-25.
[614] "Li Peng fu zongli…" 1986.
[615] Qu Geping 1981c, 14.
[616] Qu Geping 1980b, 8.
[617] Ibid.

to the government.[618] Formulating 'appropriate economic policies' that created profits for companies would allow a large amount of waste in China to be viewed as 'treasure' (宝) rather than something to simply 'discard' (弃).[619] Even though he did not explicitly use the term, Qu's comments reflect his wish to internalise the concept of 'sustainability' within these industrial enterprises.

Qu further remarked in a 1983 article in *Environmental Protection* that the country needed 'to undertake a good job in the comprehensive utilisation of natural resources and realise that the recycling of industrial emissions is one of the basic environmental protection countermeasures'.[620] By the end of the 1980s, Qu became even more outspoken about China's growing industrial waste. In a speech to the Third National Environmental Protection Conference in 1989, he noted that:

> discharges of industrial solid waste and urban waste were increasing with disposal and utilisation rates low. In 1988, the nation produced 560 million tonnes of industrial solid waste, and its comprehensive utilisation was only 26 per cent. Industrial and urban waste that has not been treated nor utilised mostly piles up in suburban residential areas, with a cumulative waste totalling 6.6 billion tonnes occupying 536 square kilometres. It has become a serious source of secondary pollution. In addition, according to recent emission statistics of nine medium- to large-sized cities, more than 150 significant accidents of toxic and hazardous waste leakages have occurred, causing pollution of water, land and air, and seriously affecting human health.[621]

Qu continued his advocacy for China to tackle its solid-waste problem at the Ministry of Energy's[622] Power Industry Environmental Protection Work Conference in 1991. This conference was the same forum where he called attention to acid rain.[623] Regarding 'hazardous waste' (有害废物), Qu noted that 'its levels were steadily accumulating'.[624] To reinforce the environmental significance of this point, he pointed to the Love Canal incident in the USA, noting that due to a chemical plant burying waste in a residential area of New York State, 'various diseases have occurred in this place' with the 'incidence of malignant tumours and deformed children particularly high'. He also noted how the US Government declared a 'state of emergency in the area', and how they were forced to relocate the residents at a cost of around

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[618] Ibid.
[619] Ibid, 18.
[620] Qu Geping 1983d, 4.
[621] Qu Geping 1989a, 13.
[622] Chinese name is 能源部.
[623] See Chapter Five.
[624] Qu Geping 1991, 8.

$4 billion, which Qu noted was 'a very painful lesson'. He described to the conference attendees his trip to Northern Europe where he discovered that 'the laws of these countries stipulate that waste should be sent to waste treatment centres for disposal'. He also stressed that the 'factories are responsible for sending on this waste' and paying appropriate fees sometimes amounting to 'several thousand dollars per ton'. Qu Geping concluded this section of his talk by mentioning that 'China's issues with hazardous waste has not yet been discussed'.[625] This discussion of toxic waste abroad demonstrates how Qu had absorbed some foreign lessons regarding environmental waste (mal-)management and through this came to ecological modernisation-based policy conclusions.

The legislative culmination of these policy discussions was the *Law of the PRC on the Prevention and Control of Environmental Pollution by Solid Waste*, which the NPC passed in 1995. This law sought to 'encourage and support clean production to reduce the creation of solid waste…the comprehensive utilisation of resources, the full recovery and rational use of solid waste, and the adoption of economic and technological policies and measures conducive to making comprehensive use of solid waste'.[626] This law classified solid waste into three distinct categories: municipal, industrial and hazardous. It also laid out the institutional system for waste management by defining institutional responsibilities.[627]

The importance of the new solid waste law for this chapter's focus is that it laid the legislative foundation for the idea of the 'circular economy', and the next section will examine that concept. It will suggest that this new environmental reform measure bore some of the hallmarks of 'cleaner production' in its focus on technological and market-based solutions. However, the concept of a circular economy expanded the ecological modernisation credentials of cleaner production by incorporating ecological-economics principles to solve China's growing waste problem. Policymakers believed that China could ill-afford a continuation of linear development (or 'traditional economic development') that went from resources to production to consumption, and then on to waste. Therefore, they needed to implement a new circular developmental model for China that operated within ecological limits.

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[625] Ibid.
[626] 1995. "Zhonghua renmin gongheguo guti feiwu wuran huanjing fangzhi fa" (Law of the People's Republic of China on the prevention and control of environmental pollution by solid waste), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Gid=13136. Accessed 25 June 2018.
[627] Ibid.

The Policy Discourse of a Circular Economy in China

Conceptual origins of a 'circular economy'. Before examining how circular economy took hold in China, this section will briefly examine the history of the concept. The idea of a circular economy arose from broader international environmental debates from the late 1960s onwards. This period marked a turning point in advanced capitalist countries where heterodox economists sought to integrate ecological principles into the discipline of economics. Kenneth Boulding was one such economist. Writing during the 1960s space race, he reflected on the steady build-up of waste, some of it radioactive and toxic, and argued that humanity needed to reconceptualise its remaining habitat and think of it as a 'spaceship'. He stressed that humans inhabited a 'closed sphere' rather than a 'virtually illimitable plane'. Therefore, its economies needed to operate more akin to a 'spaceship economy' rather than a 'cowboy economy', the latter being 'reckless, exploitative, romantic, expansive and violent' towards the environment.[628] Two years later, his notion of a spaceship economy was given a stark and symbolic illustration when Apollo 8 astronaut William Anders took his iconic 'Earthrise' photo.[629]

Boulding and other like-minded economists drew on the laws of physics, in particular the first two laws of thermodynamics to buttress their case: first, energy and matter can neither be created nor destroyed, and second, in an isolated system entropy never decreases.[630] These twin laws of thermodynamics meant humans could no longer treat economic systems in a linear, as distinct from circular, manner, ignoring the waste that accumulated at each step of the production process. This waste would eventually use up available resources and spread them throughout the economic system as useless and harmful waste materials. Some waste materials would become either prohibitively expensive or impossible to recycle, such as coal gangue, carbon dioxide, and sulphur dioxide from coal combustion.[631] As the ecological economist

[628] Boulding 1966, 10.
[629] Torok, Simon et al. 2018. "Earthrise, a photo that changed the world," The Conversation, 21 December, https://theconversation.com/earthrise-a-photo-that-changed-the-world-109009. Accessed 23 June 2019.
[630] Boulding 1966, 9; Daly 1977, 15; Georgescu-Roegen 1971.
[631] Pearce and Turner 1990, 37-38.

Herman Daly phrased it, 'technology is unable to rise above the basic laws of physics. You cannot keep burning the same gasoline over and over'.[632]

Leveraging off these ideas, two other economists, David Pearce and Kerry Turner, invoked the laws of thermodynamics to conceptualise a 'circular economy'.[633] They argued that modern economies generate waste material at each step of the production process, while circular economies incorporate waste materials back into the productive economic process. Moreover, with the knowledge that exhaustible resources such as oil, coal and minerals can only be renewed over a geological scale and renewable resources have a 'natural regenerative capacity', environmentally sustainable economic systems needed to recycle exhaustible resources and have 'sustainable yields' for renewable resources. Energy resources should draw from the sun as that is the only non-terrestrial source of energy from which the earth draws.[634] Renewable energy could include solar energy, wind energy, and hydro energy.

Nowadays the concept has become popularised due to the work of the non-profit Ellen MacArthur Foundation, which has funded circular economy (and other closely-linked concepts) in both research and practice.[635] The rest of this chapter shows how the conceptual underpinnings for a circular economy entered into the discourse of Chinese officials and academics.

The academic discussion of a circular economy. A handful of Chinese academics and researchers started to discuss the idea of a circular economy in the 1980s. One such researcher was a CASS researcher, Cheng Fuhu 程福祜, who explored the origins of ecological economics in a research paper published in *Economic Research* that called for 'further research in ecological economics'.[636] In this article, Cheng detailed how the idea of the 'circular economy' (循环经济) emerged out of Kenneth Boulding's idea of a 'spaceship economy' (宇宙飞船经济). Writing in the context of China's recently instituted one-child policy (and the 1983 campaign

[632] Daly 1991, 36.
[633] Pearce and Turner 1990, 36-41.
[634] Ibid, 37.
[635] Ellen McArthur Foundation. 2017. "What is a Circular Economy?," https://www.ellenmacarthurfoundation.org/circular-economy%20. Accessed 27 August 2018; Geisendorf and Pietrulla 2018, 2.
[636] Cheng Fuhu 1983, 49.

to reinforce that policy), Cheng also noted how Boulding in the 1960s had argued that 'unceasing population and economic growth will soon eventually use up the limitations of this "small spaceship" (小飞船)'.[637] He also linked this idea to other environmentalists, such as Edward Goldsmith who founded *The Ecologist* to stress the importance of a circular economy and ecological-economic ideas.[638] Cheng was inspired by the fears that drove many of the neo-Malthusians throughout the 1960s, 1970s and 1980s, such as population growth and high resource usage.[639]

However, it would take until 1998 before the idea of a 'circular economy' started to gain traction among Chinese authorities.[640] That momentum commenced when Zhu Dajian 诸大建, an academic in business management studies from Shanghai's Tongji University, wrote the most widely-cited article in 1998 on a circular economy, which he considered as the 'economic embodiment of sustainable development' and 'a strong policy initiative' for China.[641] Zhu noted in his article that traditional economies operated according to a linear economy, or "cowboy economy" (牧童经济), consisting of "natural resources – product and supplies – waste discharge" (自然资源–产品和用品–废物排放). Here he borrowed from the ideas of Kenneth Boulding, as well as David Pearce and Kerry Turner. He argued that China's present environmental crises were the result of this cowboy economic way of thinking: 'the three current major crises, such as population expansion, resource exhaustion, and environmental degradation, are the disastrous result of the "cowboy economy" which humans have created themselves'.[642]

Like Qu Geping, who looked abroad to justify his support of cleaner production, Zhu stressed that China should look to Germany as the best exemplar of a circular economy. He noted how in the early 1990s, Germany had instituted a series of package and waste

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[637] Ibid, 46-47.
[638] Ibid. See also Hubbard, Bethany. 2012. "The Ecologist January 1972: a blueprint for survival," Ecologist: A Journal for a Post-Industrial Age, 27 January, https://theecologist.org/2012/jan/27/ecologist-january-1972-blueprint-survival. Accessed 12 March 2018.
[639] Ehrlich 1968; Meadows et al. 1972.
[640] According to searches on CNKI using 'circular economy', there were just 16 articles published between 1983 and 1997 that focused on developing a circular economy.
[641] Zhu Dajian 1998, 39.
[642] Ibid.

management legislation for German industry by placing the responsibility on the 'manufacturers' and 'retailers' to avoid the build-up of 'used packaging' by requiring them to 'recycle it'.[643] The German legislation set targets whereby '56 per cent of German packaged items should be recycled'. Zhu remarked how this had achieved significant waste reduction within Germany in a short space of time with a metal and glass recycling rate of 90 per cent and a paper, plastic and wood recycling rate of 80 per cent. Moreover, by 1995, 'the usage of retail packaging from German households and small industries had fallen from 7.6 to 6.7 million tonnes'.[644] Zhu identified Germany's 1996 *Circular Economy and Waste Management Law* as the latest iteration of a circular economy, which sought to 'extend the circular economy of closed-loop resources and packaging to all production sectors'.[645] Zhu saw this move towards a circular economy in Germany as part of a much larger global environmental policy trend, stating that 'since the 1990s, the European Union, the United States, Japan, Australia, and Canada have successively established waste management regulations in accordance with the idea of closed-loop resources and avoiding waste generation'.[646] According to China National Knowledge Index, Zhu Dajian's articles on a circular economy remain the most-cited articles on the subject in China and, as the following sections will demonstrate, this statistic is unsurprising considering how frequently his ideas appeared in the official discussions on the topic.

An environmental bureaucracy for a 'circular economy'. The promise of a circular economy for China was quickly taken up by a group of researchers from the SEPA's Economic Policy Research Centre in a 1999 article. Following their initial support for cleaner production, these SEPA researchers, led by Cao Fengzhong 曹风中, stressed that adopting a circular economic model would help transition China away from its 'traditional economic development model' to one that was 'resource-saving'. They recognised the environmental damage that pollution caused to China's economy, albeit non-specifically, noting that 'according to foreign experts, pollution losses in developing nations account for approximately 7 to 15 per cent of GNP'. A circular economy would 'control the generation of waste in human production

[643] Ibid, 39-40.
[644] Ibid, 40.
[645] Ibid.
[646] Ibid, 39.

activities, establish a recycling mechanism that reuses nature, incorporate human production activities into the natural circulation and maintain an ecological balance with nature'. Most importantly, channelling ecological modernisation language, it would generate 'win-win' outcomes for both the environment and the economy as China reduced pollution and waste through the use of fewer resources.[647]

Moreover, a circular economy could help prevent the potential economic problems that would befall China if it did not transition away from its traditional economic model. China could potentially face 'international boycotts' (国际抵制) from 'consumers in post-industrial nations', such as the United States and Western Europe because their goods cannot maintain specific environmental 'ethical standards' (道德标准).[648] These comments can be seen as a further reflection of the ecological-modernisation view that global forces beyond governments were driving environmental reform, and that attitude shifts in post-industrialised nations, such as green consumerism and environmental ethics, could hurt China's economy.

Yu Dehui 余德辉 from the SEPA's Science and Technology Standards Division and Wang Jinnan 王金南 from the China Academy of Environmental Science's Planning Research Institute provide another example of SEPA's embrace of a circular economy in China. In 2001, they published an article in *Environmental Protection* that called for a circular economy to combat 'rapid industrialisation and urbanisation' as well as 'continuous population growth'.[649] They noted how Austria, Denmark, France, Germany, Japan, and the Netherlands had achieved 'waste recycling rates' (废弃物循环使用率) of between 50 and 80 per cent through their 'development of circular economies'.[650]

SEPA policy researcher Xu Shufan 胥树凡 then followed up this line of argument in an article which stated that China needed to institute a circular economy in order to 'establish an economic development model as per the principles of ecology'. No longer could China rely on the 'linear economic developmental model' of 'resources – product – waste'. It consumed large

[647] Cao Fengzhong, Zhou Guomin and Niu Huanyun 1999, 1.
[648] Ibid.
[649] Yu Dehui and Wang Jinnan 2001, 38.
[650] Ibid, 36.

amounts of material, generated high levels of pollution and was inefficient. Instead, China needed to adopt a 'material circulation production process of "resources – product – non-renewable resource – recycled product"'. Waste needed to 'become the raw material for the next production process' if China was ever to reduce its environmental waste.[651] Xu predicted that 'China's accession to the World Trade Organisation (WTO)' and the continued 'improvement of the economic market system' would inevitably promote a series of 'changes in China's environmental management thinking and methods', and this would help 'establish an eco-industry' with the following cleaner production and circular economic production transitions:

1. Environmental pollution moves from end-of-pipe control to full process control;
2. Environmental management is transformed from the simple control of pollution concentration to a combination of controlling pollution concentration and controlling overall emissions;
3. Environmental protection is transformed from government administrative regulation to market regulation and government regulation; and
4. Cleaner production is transformed from a single enterprise to regional clean production.[652]

Xu further stated:

> The establishment of eco-industries would enable industrial enterprises in specific regions to form interactive industrial chains, eliminating pollutants in the production process. This would not only achieve clean production processes but also minimise the generation of pollutants and maximise the use of resources.[653]

Unlike the China scholars discussed in Chapter Two, who cast China's WTO accession in a negative light, Xu believed that WTO accession and further market reforms would push China's industry towards eco-industrial practices through forcing fundamental changes to global compliance regimes. In other words, he predicted that China's WTO accession would necessitate a shift in China's environmental management strategy. In particular, the Chinese government would need to utilise 'market regulations' (市场调控) to protect the environment. This faith in the power of the market to effect positive change is another demonstration of Chinese adaptation of ecological modernisation discourse. More broadly, the overall discourse used by SEPA policy officials shows that the circular economy implicitly fell within the same ecological modernisation policy narrative as cleaner production. Given that SEPA officials

[651] Xu Shufan 2001, 22.
[652] Ibid.
[653] Ibid.

were also active in promoting cleaner production policies to supplement environmental management, it could be said that SEPA was at the ecological modernisation vanguard.

Former SEPA official and senior Chinese environmental legislator, Qu Geping, also started to give attention to a 'circular economy' before the NPC commenced its final deliberations of the draft *Cleaner Production Promotion Law* in 2002.[654] He actively promoted the concept in his position as chair of the NPC's Environmental Protection and Resources Committee in articles and speeches from 2001 onwards. In a 2001 article, he called for a circular economy, noting:

> The difference between traditional economies and circular economies is that: traditional economies are a type of economy that is constructed according to a one-directional resource – product – consumption – waste pollution emissions' (资源–产品–消费–污染排放) linear flow of materials… [D]epending on technological progress and energetically adopting non-harmful or low-harmful new technologies will significantly reduce raw materials and energy consumption, realising lower investment, higher output and lower pollution, eliminating as much as possible the emission of environmental pollutants in the production process.[655]

As alluded to earlier, Qu's comments borrowed heavily from Zhu Dajian, in particular, with respect to the unidirectional view of waste within a traditional economy.

Qu, like many of the scholars cited so far, also drew on Western experiences to show that a 'circular economic plan would integrate economic, social and environmental benefits by obtaining environmental and economically beneficial outcomes'.[656] For instance, he drew inspiration from Germany, which had doubled its GDP in the 1970s but reduced its major pollutants by 75 per cent, demonstrating that countries could 'receive "win-win" economic and environmentally beneficial outcomes'. Moreover, in 1996, the German Bundestag had passed the *Circular Economy and Waste Management Act* to 'avoid production – recycling – final disposal'. Japan had also proved that countries could integrate circular economy into their legislative agenda.[657]

Qu drew inspiration from other practical Western examples of a circular economy. He extolled the Danish 'Kalundborg Eco-Industrial Park Model' (卡伦堡生态工业园区模式),

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[654] Mol and Liu 2005, 5.
[655] Qu Geping 2001, 13.
[656] Ibid.
[657] Ibid, 11.

believing that it showed the potential for industrial parks to operate on circular economic principles. The main companies within the Kalundorborg Eco-Industrial Park were a power plant, refinery, pharmaceutical plant and gypsum board factory. These companies 'used the waste and by-products produced from other companies' production processes as the raw material in their operations through trade'.[658] Qu noted, for example, how the refinery would sell the desulphurisation gas to the power plant for coal combustion. Then the coal-fired power plant would sell the gypsum residue from its flue-gas desulphurisation operations to the gypsum factory. The fly ash from the dust removal machines would then be used in 'road construction and cement production'. Most importantly, Qu stressed, this trade between companies 'not only reduced the amount of waste generated and the cost of treatment but also produced excellent economic benefits and formed a virtuous cycle of economic development and environmental protection'.[659] In using this example, Qu was adopting an ecological modernisation argument based on both economic and environmental reasoning. This faith in ecological modernisation allowed him to believe that China could move away from its traditional development path.

SEPA Director Xie Zhenhua also joined Qu Geping in advocating for a circular economy. A CCP member since the late 1960s, Xie's education was disrupted by the Cultural Revolution, but he graduated with a degree in engineering and physics from Tsinghua University in 1977. In 1982, after serving as a teaching assistant and Party Secretary of the Communist Youth League committee at Tsinghua University, Xie moved into the environmental protection sphere, working as an engineer under Qu at the Ministry of Urban and Rural Construction and Environmental Protection's Environmental Protection Bureau. Xie would remain working under Qu in the new State Environmental Protection Bureau (SEPB) until 1993 when he succeeded him as the Bureau's director. Xie had powerful Party credentials, having served from 1997 in the Central Commission for Discipline Inspection and Central Committee.[660]

[658] Ibid, 12.
[659] Ibid, 13.
[660] Renmin wang. 2002. "Xie Zhenhua tongzhi jianli" (Xie Zhenhua's resume), http://www.people.com.cn/GB/shizheng/ 252/9667/9683/20021128/876285.html. Accessed 16 June 2019.

In a 2001 article in *Seeking Truth*, Xie discussed the broader significance of the concept of a circular economy:

> From a global perspective, out of the necessity to preserve resources and protect the environment, a circular economy and a green economy have become an essential orientation in world economic development. Environmental technologies that promote a circular economy and green economic development are some of the world's most advanced technologies, becoming the object of competition among countries all over the world.[661]

Xie's comments reveal his ecological rationality through the need to 'protect the environment', but they also demonstrate his economic rationality through the awareness that there was a global trend towards economies adopting circular economic principles. China needed to improve its 'productivity' (生产力), he argued, but it could no longer do that through 'man conquering nature' (人类征服自然).[662] Showing his Marxist dialectical pedigree, Xie linked his ideas to Fredrich Engels' quote from *Dialectics of Nature* that each step to improve productivity from nature would result in unintended consequences.[663] Humanity, Xie stressed, 'cannot surpass or violate the laws of nature', and that 'in the process of developing productivity, we must promote the coordination and harmony between man and nature, coordinate social productivity with natural productivity, coordinate economic reproduction with natural reproduction, and achieve the virtuous cycle of ecological environment and natural sustainable supply'.[664] Xie's comments reflected a significant development in ecological modernisation ideas in China. Reflecting the forum of his article, China's leading socialist Party journal, Xie positioned circular economy with the progress of socialism in China. A

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[661] Xie Zhenhua 2001, 13.
[662] Ibid.
[663] That quote in full was: '[l]et us not, however, flatter ourselves overmuch on account of our human victories over nature. For each such victory nature takes its revenge on us. Each victory, it is true, in the first place brings about the results we expected, but in the second and third places it has quite different, unforeseen effects which only too often cancel the first. The people who, in Mesopotamia, Greece, Asia Minor and elsewhere, destroyed the forests to obtain cultivable land, never dreamed that by removing along with the forests the collecting centres and reservoirs of moisture they were laying the basis for the present forlorn state of those countries. When the Italians of the Alps used up the pine forests on the southern slopes, so carefully cherished on the northern slopes, they had no inkling that by doing so they were cutting at the roots of the dairy industry in their region; they had still less inkling that they were thereby depriving their mountain springs of water for the greater part of the year, and making it possible for them to pour still more furious torrents on the plains during the rainy seasons. Those who spread the potato in Europe were not aware that with these farinaceous tubers they were at the same time spreading scrofula. Thus at every step we are reminded that we by no means rule over nature like a conqueror over a foreign people, like someone standing outside nature – but that we, with flesh, blood and brain, belong to nature, and exist in its midst, and that all our mastery of it consists in the fact that we have the advantage over all other creatures of being able to learn its laws and apply them correctly.' See Engels 1954 [1876], 241-242.
[664] Xie Zhenhua 2001, 13.

circular economy would allow China to achieve a socialist market economy in a manner that conformed with, rather than contradicted, sustainable development. The CCP could only remain a vanguard if it was cognisant of the laws of nature as well as social relations.

In another 2003 article published again in *Seeking Truth*, Xie leveraged off Qu Geping's essays from two years earlier on a circular economy. Xie stated that China had to transition away from its traditional economic model that 'realises economic growth by continuously turning resources into waste, neglecting the organic connections and symbiotic relationships among various industries within the economic system'.[665] Like Qu, Xie believed that under the principles of a circular economy, companies could synchronously achieve environmental outcomes with profits achieved for all companies. He also noted in another article in the same year that many production companies would be unable to handle the recovery and disposal of waste, expanding the scale of supporting industries in environmental protection and resource recycling.[666] In addition he predicted that 'employment opportunities' (就业机会) would accrue from adopting a circular economy.[667]

He conceded that 'in light of the relatively weak environmental awareness of residents in China, especially in rural areas, some local governments were forced to ignore environmental protection due to economic growth and employment pressure'. However, the rise of profitable 'centralised waste management' (处理的废弃物集中) facilities would offer an 'expansion in employment'.[668] He drew on a paper from Japan's Ministry of International Trade and Industry, *Circular Economy Concept*, to highlight that circular economy policies would enable Japan's new environmental protection industry to 'create nearly 37 trillion yen in output value and provide 14 million jobs'.[669] Xie's articles and speeches fuelled the ecological modernisation enthusiasm that was permeating official Chinese discourse at the turn of the century, in particular the optimism in the economic benefits that would accrue with new sustainable industries.

As the discussion has shown so far, the promotion of a circular economy had primarily originated from senior officials from within China's governmental and legislative organs that

[665] Xie Zhenhua 2003a, 54.
[666] Xie Zhenhua 2003b, 9.
[667] Ibid; Xie Zhenhua 2003a, 54.
[668] Xie Zhenhua 2003b, 9.
[669] Xie Zhenhua 2003a, 54.

focused on environmental issues, such as the SEPA. However, as the next section will demonstrate, mirroring the experience of 'cleaner production', China's economic developmental agencies soon became an active voice in the ecological modernisation narrative.

China's economic bureaucratic organs and a 'circular economy'. In the early 2000s, researchers from China's economic agencies also began to discuss the feasibility of a circular economy. As the discussion in Chapter Five regarding cleaner production suggested, their entrance into the circular economy debate reflected how ecological modernisation ideas were permeating into institutions that had previously focused on narrower economic development perspectives. The State Economic and Trade Commission (SETC) drove the early discussion by these economic agencies. As Chapter Five demonstrated, the State Council had entrusted it, over the State Development Planning Commission (SDPC) and SEPA, with formulating cleaner production policy and legislation in China. In 2002, a researcher from the SETC's Resource Conservation and Comprehensive Utilisation Division, Feng Liang 冯良, wrote one of the first publicly-released articles by a SETC official on the idea of a circular economy. The central theme of Feng's article was that China needed to undertake significant development in both a 'knowledge economy' (知识经济) and a 'circular economy'.[670] He defined 'knowledge economy' as an economy marked by 'increased investment in research and development, improved technology levels, and enhanced international competitiveness through technological innovation so that development has an inexhaustible drive'.[671] He said that a circular economy placed 'emphasis on the comprehensive utilisation and recycling of resources and waste, reducing and detoxifying waste, and minimising the generation of environmentally hazardous waste'. Feng argued that these twin economies both 'promoted' (促进) and 'complemented each other' (相辅相成), and that 'this was an area in which the government should actively utilise its functions and actively promote' such development. Drawing on articles discussed in the previous section, he also argued that China should look to Germany and Japan as their 'legal system for the development of a circular economy' was 'well developed' (很好的发展).[672]

[670] Feng Liang 2002.
[671] Ibid, 18.
[672] Ibid.

Feng also signalled that ecological modernisation ideas underpinned his support of a 'circular economy' when he argued that the government needed to improve its economic 'incentive mechanisms' (激励机制). He explicitly supported the value that seeking 'profit' (利润) had as a means to achieve environmental protection:

> Without the implementation of environmental protection laws and standards, companies will not actively use waste and [will instead] directly discharge into the environment. Similarly, if there is no economic benefit, enterprises that maximise profits will reduce their investment in waste disposal, even if the government forces them to do it, they will find all kinds of excuses not to use preferential policies, or they will secretly discharge into the environment.[673]

He argued that developing the 'circular economy by economic means was an organic extension of the defence used by developed countries to protect the environment'.[674] He admitted that although China's policy of 'whoever creates pollution is responsible for its treatment' (谁污染谁治理) was similar in many respects to the 'polluter pays' (污染者付费) principle, China's implementation of the policy was 'poor' (不好), and 'seriously dampens the enthusiasm of comprehensive utilisation of resources' in China. Therefore, China should look towards the experience of developed nations in implementing 'financial subsidies' (资金补助) for waste generators who transferred their waste to resource utilisation companies. In China, Feng noted that waste generators often made these companies pay for their waste, such as industrial waste or fly ash, often to the point that comprehensively utilising waste was 'unprofitable' (无利可图). China needed to improve economic incentives for waste generators and waste utilising companies through 'price, taxation and fiscal policies to stimulate the development of a circular economy'.[675] Feng's comments clearly dovetail with the ecological modernisation solutions explored in Chapters Two and Five, such as the economic incentives that drove calls for research and development in cleaner production methods.

Later that same year, senior officials from the SETC also started to advocate for a circular economy publicly. Vice-director of the SETC, Huang Shuhe 黄淑和, discussed the circular economy in a speech he presented on 'promoting sustainable development' at the National Conference on Supply and Marketing Cooperative for Renewable Resources. Huang argued that due to the massive amounts of waste produced each year, China needed to 'accelerate the

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[673] Ibid, 21.
[674] Ibid.
[675] Ibid.

recycling of renewable resources'. Each year 'five million tonnes of scrap steel, more than 200,000 tonnes of non-ferrous metallic waste, 14 million tonnes of waste paper and large amounts of waste plastic and glass' were left non-recycled, amounting to 'thirty billion yuan' in 2001.[676] Huang further stressed that 'accelerating the recycling of renewable resources was an objective requirement for both pollution control and environmental improvement' because the country's 'accumulated waste had reached more than 6 billion tonnes, occupying 500 million square metres of land' and causing 'serious and potential pollution to soil, groundwater and the atmosphere'. Huang noted that 'how to effectively recycle and prevent secondary pollution in the environment… had aroused widespread concern in society'.[677] He argued:

> Vigorously carrying out recycling of renewable resources not only would reduce the exploitation of primary resources, but also save a lot of resources. It also can promote the transformation of economic growth modes and promote the development of a circular economy with "resource – product – renewable resources" as its main content.[678]

Huang's argument was consistent with ecological modernisation reasoning. It combined concern for the ecological damage caused by excessive waste while employing an economic rationality towards the 'economic value' of unrecycled products in China and reduced resource usage.

These conversations laid the groundwork for a wider acceptance of a circular economy within China's economic agencies. However, the moment where the circular economy truly developed as a concept occurred in 2004. The government official who drove this development was Ma Kai, the inaugural head of the NDRC.[679] In his new role, he delivered speeches and published articles on China's need to transition to a circular economy.[680] The following paragraphs show how he built on many of the environmental fears of the 1980s, such as population growth, resource usage and waste accumulation. Like Xie Zhenhua, Ma Kai's education had been interrupted by the Cultural Revolution. He was 36 years old when he graduated with a political economy degree from the People's University in 1982.[681] From there, Ma Kai progressed from the Beijing Pricing Bureau[682] to become a deputy director in the

[676] Huang Shuhe 2002, 4.
[677] Ibid.
[678] Ibid.
[679] Ma Kai was briefly mentioned in Chapter Five.
[680] See, for example, Ma Kai, 2004a, 2004b.
[681] Chinese name is 人民大学.
[682] Chinese name is 北京市物价局.

National Pricing Bureau[683] and then became a vice-director in both the State Commission for Restructuring the Economy[684], State Planning Commission and SDPC. In 1998, he was appointed as a deputy secretary-general in the State Council and served under Luo Gan 罗干, who was the then-Secretary-General of the State Council. Ma was a member of the Central Commission for Discipline Inspection (1997–2002) and a member of the Central Committee in the 16th, 17th, and 18th Party Congress, serving as a member of the Politburo in the 18th Party Congress.[685] These positions reveal that Ma Kai had political influence, and as this section will show he used this to promote the incorporation of circular economy principles into China's environmental policy agenda.

As director of the NDRC, Ma Kai spoke at the National Circular Economy Work Conference in 2004. He advocated that China move towards a circular economy, based on the principle of 'reduce, reuse and recycle', pointing out in an article in *Macroeconomic Management* that 'natural resources are not inexhaustible' and warned that 'the carrying capacity of the ecological environment was not unlimited'.[686] Ma's article described a litany of problems that were afflicting China's biosphere. In 2003, China had 'discharged 46 billion tonnes of wastewater', and that much of this wastewater was 'directly discharged into rivers, streams, lakes and reservoirs', threatening the safety of China's scarce drinking water. He also stressed that China's atmospheric pollution was worsening, highlighting that soot and sulphur dioxide emissions 'ranked first in the world' and were 'greatly exceeding [China's] environmental capacity'. Regions affected by acid rain also 'accounted for one-third of the country's land area'.[687] In addition, solid waste was 'becoming increasingly prominent', both with industrial and domestic waste. The national discharge of solid industrial waste 'added up to 19.41 million tonnes' in 2003, of which, Ma noted, '3,000 tonnes of hazardous waste materials were discharged into the environment without any treatment, endangering the health

[683] Chinese name is 国家物价局.
[684] Chinese name is 国家经济体制改革委员会.
[685] Xinhua she. 2013. "Guowu yuan fu zongli Ma Kai jianli" (Vice-Premier Ma Kai's resume), 16 March, http://www.xinhuanet.com/2013lh/2013-03/16/c_115051019.htm. Accessed 23 June 2019.
[686] Ma Kai 2004a, 4.
[687] Ma Kai 2004b, 22.

of the people'. Of domestic waste, only around 54 per cent went through any waste management.[688] Furthermore, he noted:

> Rural livestock and poultry manure, aquaculture pollution, and irrational use of pesticides and fertilisers have made rural environmental problems increasingly serious, and directly threatened the quality and safety of agricultural products. The deterioration of the ecological environment through the retreat of grasslands, soil erosion, and decline in the quality of forest ecosystems, and through the sharp reduction in biological diversity have all severely affected ecological security [in China].[689]

It was for these reasons that he believed that China should develop a circular economy to include 'all walks of life'. An ecological rationality underpinned Ma's support for implementing a circular economy. He argued that China's development had 'seriously affected ecological security' and that China needed to move beyond treating economic development as a 'one-way linear process' (单向式直线过程). A circular economy provided 'a fundamental way to reduce and lighten environmental pollution'.[690] Like other government officials quoted so far in this chapter, he viewed Japan, Germany, and also the United States as the supporting models of circular economic practice.[691]

Examining Ma Kai's rhetoric, it is clear that he understood the foreign intellectual and conceptual origins of a circular economy. He cited Rachel Carson's *Silent Spring*, noting that it 'explained the dangers of insecticide use by humans', and that 'it sounded the alarm' regarding an 'industrial and social environment crisis'.[692] He also mentioned the Club of Rome's *Limits to Growth*, remarking that 'although the views in this report were somewhat one-sided and pessimistic', it raised the idea that 'resource supply and environmental capacity' cannot be met indefinitely, arousing 'great concern worldwide'.[693] Moreover, Ma traced the definition of a circular economy back to the work of Kenneth Boulding, noting how he 'likened human life on earth to a spacecraft, suggesting that, if there was an irrational exploitation of natural resources, once it exceeded the carrying capacity of the Earth, it will lead to destruction'.[694] Ma also framed a circular economy within the broader sustainability narrative of *Our Common Future* and the Rio Earth Summit. His literature review demonstrates that as

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[688] Ibid.
[689] Ibid.
[690] Ibid.
[691] Ibid.
[692] Ibid, 21.
[693] Ibid, 22.
[694] Ibid, 20-21.

well as appreciating the empirical challenges faced by China, he intellectually situated China's development and environmental challenges within the global modern awakening of environmental consciousness, or what Arthur Mol terms 'the second wave of environmental awareness'.[695]

Following Qu Geping, Xie Zhenhua and other officials, the benefits of a circular economy (along with cleaner production) for Ma Kai involved the promise that circular economic principles would assist China in its transition away from 'traditional economic growth'. He argued:

> The pursuit of economic benefits [from introducing circular economic practices] emphasises ecological benefits as well as economic benefits. It not only also promotes economic growth, but it also continuously improves the people's living conditions allowing people a productive life with an enjoyable environment that allows them to drink clean water, breath clean air, and eat food at ease.[696]

In that earlier cited article in *Macroeconomic Management* Ma Kai also stressed that more traditional economic benefits would accrue from a circular economy through increased productivity, efficiency and competitiveness:

> Practice has proven that low levels of resource utilisation have already become a substantial obstacle for companies to lower production costs and increase economic efficiency and competitiveness. Significantly expanding a circular economy with high resource utilisation rates has already become one of the essential and pressing tasks that China faces to increase its international competitiveness.[697]

While China's growing ecological rationality provided a key driver for the progression of circular economy as a concept, it was events within China during the early 2000s that provided the economic rationality needed for China's developmental bureaucracy to promote the concept more vigorously. In a speech he delivered in 2004 to the aforementioned National Circular Economy Work Conference, Ma raised fears about China's dwindling resources, arguing that 'developing a circular economy is a fundamental way to ease resource constraints…[as] China's resource endowment was relatively lacking with total quantities somewhat large, but low in per-capita levels'.[698] These constraints would grow, he argued, with 'rapid economic development and an increasing population'. When viewed from a per capita perspective, China possessed 25 per cent of the global per capita average of water resources, just under 40 per cent of the global per capita average farmland, and 20 per cent of the global

[695] Mol 2001, 10.
[696] Ma Kai 2004b, 24.
[697] Ma Kai 2004a, 13.
[698] Ibid, 4.

per capita average of forests. For oil, natural gas, and copper, they respectively occupied 11 per cent, 4.5 per cent, 18 per cent and 7.3 per cent.[699] For Ma Kai the problem was that while 'China's socialist modernisation had received global recognition for its achievements, and its economic growth transformation also had obtained tremendous achievements' it had depended on a 'high investment, high consumption, high emissions, uncoordinated, challenging to recycle, low efficiency' growth model.[700] By 2003, Ma noted, China's economic size had grown to be four per cent of global GDP, but its 'resource consumption in the world was very high, with oil consumption at 7.4 per cent, raw coal consumption at 31 per cent, steel consumption at 27 per cent, aluminium oxide at 25 per cent, and cement consumption at 40 per cent'. Yet, China's economy was still one-eighth the size that of the United States (in terms of GDP), meaning that China's resource consumption would grow as it surged towards reaching parity with the US economy (unless, of course, it could achieve 'sustainable development').[701] While Ma acclaimed this period as 'a golden age of development' (黄金发展时期), he also warned that resource constraints affecting water, land, energy and minerals would become more and more prominent, making the period also an 'age of contradictions' (矛盾凸现时期). He stressed that 'faced with this situation, it was particularly important, in fact urgent, to vigorously develop a circular economy and accelerate the establishment of a resource-saving society'.[702] His comments illustrate some of the strongest economic justifications expressed by a senior economic bureaucrat in support of environmental reform measures.

The backdrop to Ma's comments were Chinese authorities' fears over dwindling resources and the inability to transport and supply critical economic resources to parts of China. For instance, as a result of its high resource consumption and low resource efficiency, China also was experiencing oil, coal, and electricity shortages across the winter of 2003 and 2004. The country had become a net importer of oil in 1993 and was steadily having to acquire more oil from the global market. China's coal shortages were due to transportation problems associated with getting coal delivered to coal-fired power plants because of excessive snow. Ma Kai predicted that:

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[699] Ma Kai 2004b, 21.
[700] Ma Kai 2004a, 3.
[701] Ma Kai 2004b, 23.
[702] Ibid, 21.

> if we continue to follow the traditional development model and achieve industrialisation and modernisation with a large number of resources, it will be difficult to sustain. Since the second half of last year, the continuing tension in coal, electricity, and oil transportation has fully demonstrated this point, and once again sounded an alarm. In order to reduce the pressure of economic growth on the supply of resources, we must vigorously develop a recycling economy to promote the efficient use and recycling of resources.[703]

As China's leading economic planner, Ma envisaged a circular economy as a vital economic solution to overcome the 'resource scarcity' and transportation problems exacerbated by China's economic growth model and geography. Combined with his earlier comments concerning the environmental problems afflicting China's biosphere and the Club of Rome's *Limits to Growth*, Ma presented an ecological modernisation reflection on China's development. He believed that for China to move to its next phase of economic development, its industries needed to improve their ecological and economic competitiveness vis-à-vis other countries. They could no longer rely on a supply of cheap, abundant and secure energy and resource supplies to drive China's economic development in the future. A circular economy provided optimal ecological and economic security.

Beyond these resource-based fears, trade-related anxieties also contributed to Ma's support of a circular economy. In another 2004 article he raised the importance of circular economy (as well as the associated concept of cleaner production) in helping China to overcome 'non-tariff barriers' (非关税壁垒), or what he termed 'green barriers' (绿色壁垒). Foreign countries that were more developed and greener than China, he argued, would eventually place higher barriers on China's exports. This was a new line of argument not previously utilised by senior officials in their support for ecological modernisation ideas, although, as shown earlier, more junior officials had raised this point. Ma noted that 'due to economic globalisation, the role of tariff barriers had weakened', but he warned that in this new era of globalisation 'non-tariff barriers, including "green barriers" have become increasingly prominent'.[704] He feared that the European Union could place restrictions on products that were incongruent with circular economic principles: 'some developed countries, in order to protect their interests, already had established many technical standards' that were 'difficult to meet for developing countries concerning their resources and environment':

> They require not only the final products to meet environmental protection requirements, but also product development, packaging, transportation, use, and recycling. For example, the European Union requires that 95 per cent of the packaging must be a substance that can be recycled. In February of last year, the European Union promulgated the Waste Electrical and Electronic Equipment Directive and Restriction of Hazardous Substances Directive. The regulations state that from August 13, 2005, producers are responsible for

[703] Ma Kai 2004b, 26.
[704] Ibid, 21-24.

> recycling and disposing of electronic waste and electronic equipment; since July 1, 2006, six kinds of harmful substances such as lead, copper and tin will be restricted in more than a hundred types of electronic and electrical equipment sold in the European Union. For example, as the international community pays increasingly more attention to the ecological environment and climate change, the energy efficiency standards and logos with energy conservation as the primary purpose have become new non-tariff barriers.
>
> These non-tariff barriers will have a severe impact on China's development of foreign trade, especially the expansion of exports. At present, China has become one of the biggest victims of non-tariff barriers such as "green barriers". For example, the scope of the two European Union directives not only includes the electronic and electrical equipment products of our country but also the parts and components and raw materials industries, which cover all the mechanical and electrical products exported by China to the European Union. In the face of increasingly severe non-tariff barriers, we must attach great importance and respond positively, especially to comprehensively promoting cleaner production, vigorously developing a circular economy, and gradually making our products meet international standards in terms of resources and environmental protection.[705]

Ma's views on global trade represented a new type of economic rationality underpinning the advocacy for ecological modernisation concepts such as a circular economy. Although Ma believed that a circular economy would help reduce China's resource footprint through more efficient production, he also saw a circular economy as a critical measure that would prevent more developed countries from blocking Chinese exports, and thereby harming China's ongoing economic development. In this sense, Ma's focus on 'green barriers' stands in contrast to the SEPA researcher Xu Shufan, whose views were canvassed earlier in this chapter. Ma did not see China's WTO accession purely in its capacity to promote 'changes in China's environmental management thinking and methods'.[706] China had generated so much prosperity from global trade that any risk to that prosperity needed to be confronted head-on. Ma's comments also show a deviation from Cao Fengzhong and Cao's SEPA colleagues. Rather than see the threat from 'consumers in post-industrial nations' who could instigate 'boycotts' of Chinese goods based on specific 'ethical standards', he saw the threat from global regulators who could prevent Chinese exports from passing through customs in these nations.

As this section has shown, ecological modernisation discourse was employed by different officials representing their own bureaucratic agency. On the one hand, environmental bureaucrats stressed fears based on notions of green consumerism and environmental ethics, rooted in the ideas of public environmental awareness. On the other hand, economic bureaucrats placed their focus on economic-based concerns, such as trade boycotts. Yet a consensus was emerging that the circular economy was a necessary component in the struggle

[705] Ibid.
[706] Xu Shufan 2001, 22.

to overcome the new contradictions between economic growth and environmental sustainability.

The policy status of a circular economy in China. These discussions over the circular economy during the period from 2000 to 2004 began to be incorporated into policy measures. In December 2004, the NPC passed an updated *Law of the PRC on the Prevention and Control of Environmental Pollution by Solid Waste*. The updated law called for the nation to 'promote cleaner production and circular economic development', affirming how Chinese authorities twinned these ecological modernisation concepts. Then, in 2005, the State Council issued a document on *Several Opinions on Speeding up the Development of a Circular Economy*. Its stated aim was to:

> strengthen [resource] reserve conservation and environmental awareness, reinforce legal system construction, perfect policy measures, bring into play market mechanism functions that promote circular economic development with enhancing resource productivity and reducing waste emissions as the primary objective and technological innovation and systemic innovation as the driving force'.[707]

In 2007, the NPC passed the *Law of the PRC on Promoting a Circular Economy*.[708] It stipulated the institutional and administrative framework that would allow China to 'promote the development of circular economy, improve the efficiency of resource utilisation, protect and improve the environment, and achieve sustainable development'.[709] It mirrored the language of the 2005 State Council *Opinion* on a circular economy. These laws and policies echoed the optimistic economic and technological language that is characteristic of ecological modernisation.

Despite these measures, there are commentators who speculate that even though a circular economy has been 'enacted' in China, there remain significant obstacles to its implementation. Mathews and Tan argue that 'China must overcome technological, financial, and institutional barriers to turn the current eco-industrial initiatives into a circular economy operating at a larger

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[707] Guowu yuan. 2005. "Guanyu jiakuai fazhan xunhuan jingji de ruogan yijian" (Several opinions on speeding up the development of a circular economy), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid=29af91a4ba20d3d cbdfb. Accessed 23 May 2018.
[708] Abbreviated as *Circular Economy Promotion Law*.
[709] 2002. "Zhonghua renmin gongheguo xunhuan jingji cujin fa" (Law of the People's Republic of China on promoting a circular economy), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid=655ad4b68f55f896bdfb. Accessed 23 May 2018.

scale'.[710] Geng and Doberstein highlight that 'China lacks the human institutional capacities to encourage public participation in a circular economy'.[711] Xue et al.'s survey of local government officials suggests that there is a 'rhetoric reality gap' between central authorities goals for a circular economy and practical action at a local level.[712] Like the concept of cleaner production explored in the previous chapter, the policy flaws in a circular economy lie beyond the scope of this chapter. However, the discursive evidence presented in this chapter suggests that Chinese officials believe that a circular economy deserves to be placed within their optimistic sustainability narrative for the future. A 2018 revision to China's circular economy law shows that authorities acknowledge that improvements are needed in order to move China's economy along the path towards circular principles.[713] They remain of the view that it provides their most effective measure to reduce and eventually overcome the contradictions between ongoing economic development and the promise of sustainable development.

Conclusion: China's Pursuit of a Circular Economy and Ecological Modernisation

This chapter has shown that from the 1980s onwards, Chinese officials expressed anxiety about the environmental impacts of a growing population, burgeoning resource use, and accumulating solid waste. From these environmental concerns, China's policymakers eventually started to advocate for the implementation of a 'circular economy' that would allow future economic growth while limiting the environmental impact of such growth through the reducing, reusing and recycling of resources.

In that context, how does a circular economy in China align with ecological modernisation ideas? Chinese officials saw circular economy, like cleaner production, as part of a broader sustainability narrative that grew from the United Nations Conference on Human Environment in 1972 and culminated at the Rio Earth Summit and the global consensus for sustainable development. It emerged from the same anxiety that led the NPC to vote in favour of the *Cleaner Production Promotion Law* discussed in Chapter Five. In contrast to the earlier debate over cleaner production, there is less doubt expressed among leading officials over the merits of a circular economy. Chinese authorities had already accepted that their traditional

[710] Mathews and Tan 2011, 451.
[711] Geng and Doberstein 2008, 236.
[712] Xue et al. 2010.
[713] 2018. "Zhonghua renmin gongheguo xunhuan jingji cujin fa (2018 xiuzheng)" (Law of the People's Republic of China on promoting a circular economy (2018 amendment)), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid=86e0348ef0b62b74bdfb. Accessed 25 May 2018.

developmental path was dirty, damaging and wasteful. This 'traditional economic developmental model' was exacerbated by population pressures that were unsustainable and this became part of a sustainable development discourse which was touted as the only possible path that could lead to a convergence of future economic and environmental objectives. Remarks by key officials such as Qu Geping, the SEPB's Xie Zhenhua and the NDRC's new director Ma Kai demonstrate that the circular economy emerged from a reflective assessment of traditional development in China. They argued that China needed to adopt a circular economy if they were going to overcome the wide range of environmental problems threatening its 'ecological security', to repeat the words of NDRC Director Ma Kai. Furthermore, Xie's support of a circular economy highlights how he sought to place it within the political narrative of socialism and China's progression to a 'socialist market economy', which further shows the variety of political justifications used to promote such environmental reform ideas in China.

The official discussion of a circular economy shared another ecological modernisation rationale with cleaner production: the promotion of science and technology and market-based measures to reduce the environmental impact of modernisation. That technological emphasis is seen in the official language set out throughout this chapter. The optimism towards environmental technologies justified a circular economy in the same way as it had supported cleaner production. In their discussion of a circular economy, Chinese officials also drew on the debate over cleaner production through their emphasis on targeted regulatory measures to help foster market-based solutions for China's environmental issues.

All the officials canvassed in this chapter held to the consensus that circular economic practices would allow China to achieve more sustainable development. They also acknowledged that the Chinese government would have to provide the impetus and catalyst for this transition through policy measures, such as incentive mechanisms to promote notions of environmental sustainability within Chinese enterprises. Yet these officials understood that these government measures had to conform with new economic rationalities, such as the profit motive, rationalities that had been promoted by the great reforms begun under Deng Xiaoping. Another similarity with the discourse surrounding cleaner production, was the manner in which Chinese officials drew on foreign examples of ecological modernisation to rationalise their support of specific environmental reforms (see Chapter Two). They drew on the same overseas

examples that ecological modernisation theorists used to justify their arguments. Chinese officials were fashioning ecological modernisation for Chinese conditions.

This chapter has also highlighted the economic rationality that formed the foundation for support of Chinese ecological modernisation. The earlier part of the chapter demonstrated that fears regarding the inefficient use of resources dated back to the 1980s. However, the specific economic impetus to the circular economy policy discussion within the Chinese government was China's economic resource constraints. These shortfalls had become acute in 2003-2004 when China experienced a series of rolling blackouts as coal production and transportation was unable to match demand from China's coal-fired generators. Senior government officials such as Ma Kai explicitly listed these concerns in their support for a circular economy. If the Chinese economy was to overcome these resource-based 'contradictions', then it needed to move toward a 'resource-saving society'. This focus on economic efficiency is an essential aspect of the more general ecological modernisation theorising because it promises to raise profits and lower environmental impact. What this chapter has shown is that China's officials have increasingly used such environmental discourse to frame their future economic development measures.

The example of the circular economy policy discussion also shows how new economic objectives can materialise within these ecological modernisation reform ideas. The concept of a circular economy moved Chinese economic rationality beyond the threat of the depletion of valuable resources on which the economy depended. Instead, the economic threat that now emerged was the possibility that 'more developed' economies could raise 'green barriers' on inefficient or polluting Chinese products across the full life-cycle of the production process. This tied ecological concerns to economic rationality. Since China commenced its 'reform and opening up' from the late 1970s, its economic prosperity had been based on trading with developed economies, so the possibility that Chinese products could be prevented from accessing foreign markets unnerved Chinese officials. Ma Kai expressed this anxiety when he warned that European Union legislative measures to eliminate and reduce toxic waste and increase recycled packaging would hurt Chinese manufacturers. The circular economic solution to non-tariff barriers also reflected the optimism inherent within ecological modernisation, and the sub-text to Ma's comments also revealed his ecological-modernisation faith in the eventual 'inevitability' of sustainable development. Rather than fight these global

regulatory threats, Ma understood that the Chinese economy needed to move with the global trend towards ecological modernisation ideas and adopt a circular economy.

The thesis so far has shown that Chinese policymakers have increasingly looked to ecological modernisation policies to reform environmental governance in China. Chapter Five and Chapter Six have both shown how Chinese authorities have legislated measures to encourage the 'promotion' of cleaner production and a circular economy – two environmental ideas congruent with ecological modernisation. The next chapter moves on to another environmental reform measure, 'green GDP', to examine whether it conforms with ecological modernisation. The discussion of this new environmental accounting tool entered the policy discourse around the same time as a 'circular economy', while Chinese policymakers were experiencing somewhat of a policy fervour towards ecological modernisation ideas. Its supporters sought a new environmental indicator that could quantify the costs of economic development. Through the study of green GDP, the next chapter not only provides another chance to examine the influence of ecological modernisation in China, but it also allows for an analysis of the type of ecological modernisation ideas that are politically permissible in contemporary China.

Chapter Seven: Green GDP in China

Chapter Five and Chapter Six have described the circumstances that led China to legislate the *Cleaner Production Promotion Law* and advance measures to promote an economy based on circular economic principles. These examples of cleaner production and circular economy have illustrated how Chinese authorities began adopting an ecological modernisation discourse in setting China's environmental policy agenda during the 1990s. These chapters also highlighted that foreign stakeholders have influenced the Chinese government in framing its environmental policy. Through the 'reform and opening up' process (outlined in Chapter Four), Chinese officials could no longer rely on endogenous solutions. They were forced to look abroad for suitable policy ideas that could assist in China's transition to sustainable development. In the case of cleaner production, these solutions emerged out of the United Nations Environmental Programme's (UNEP) series of workshops in the lead up to the Rio Earth Summit. In the case of a circular economy, solutions originated from Western academic discussions in the 1960s that sought to situate economics within the natural boundaries of ecology. Since the 1980s, senior Chinese officials and their subordinates became increasingly aware of the possible environmental policy options that would help them chart a sustainable path for China's economic modernisation.

It is within the context of this turn towards a greater ecological consciousness that this chapter examines 'green GDP' (绿色 GDP, or 绿色国内生产总值).[714] The chapter starts with a discussion of the origins of the concept. It then examines the early debates surrounding green GDP and the utility of GDP as an indicator of 'sustainable development'. The third section of this chapter explores the official policy discourse surrounding green GDP. In particular, it explores the policy commentary from government bureaucrats in the State Environmental Protection Administration and National Bureau of Statistics. This policy commentary promoted green GDP as a way for the Chinese government to account for and achieve sustainable development. The final section then details the broader political context regarding green GDP, which illustrates how entrenched political interests can stymy the inclusion of ecological modernisation ideas into China's environmental policy agenda. This chapter concludes by arguing that green GDP demonstrates the growing willingness of Chinese

[714] It is also called 'green national accounting' (绿色国民经济核算)

policymakers to incorporate innovative ecological modernisation solutions that moves beyond the technological and market ideas of cleaner production and circular economy. However, the chapter also will show that the concept of green GDP eventually pushed at the margins of what was politically acceptable according to China's prevailing economic rationality.

The Green GDP Policy Debate and Ecological Modernisation in China

The conceptual origins of green GDP. Like the other ecological modernisation concepts discussed so far in this thesis, the idea of 'accounting for' China's environmental pollution and resource stocks through the creation of a 'green GDP' emerged from abroad. From 1978 onwards, the Norwegian government had instituted an environmental accounting system that included the physical values of a nation's environment (such as air pollution and carbon dioxide emissions), as well as a country's natural resources (such as fish, oil, and forests). They used these values as the empirical basis for economic models that sought to 'show how economic development affects the environment and how activities and measures to improve the environment (e.g. taxes) affect the development of both the environment and the economy'.[715] The Norwegians also promoted this idea internationally. The 1987 World Commission on Environment and Development report, chaired by former Norwegian Prime Minister Gro Harlem Brundtland, called for 'changing the quality of growth' through accounting for the 'exploitation' of natural resources such as forests, air, water and soil resources that were typically not accounted for in national accounts.[716]

Other international organisations sought to develop the implementation of this new environmental accounting concept. In the fervour of sustainable development ideas that took hold in the lead up to the 1992 Rio Earth Summit, the World Bank and UNEP-sponsored workshops discussed the merits of such accounting frameworks.[717] In particular, the World Bank partnered with the Mexican government to establish a set of integrated environmental and national accounts that would place monetary values on natural resources and the

[715] Alfsen et al. 2006, 11-18; Nese 1996; Sæbo, Hans. 1994. "Natural resource accounting – The Norwegian approach," Statistics Norway, https://www.ssb.no/a/histstat/not/not_9409.pdf. Accessed 5 March 2018.
[716] WCED 1987, 46.
[717] Sæbo, Hans. 1994. "Natural resource accounting – The Norwegian approach," Statistics Norway, https://www.ssb.no/a/histstat/not/not_9409.pdf. Accessed 5 March 2018.

environment that were adjusted through 'satellite accounting' to reflect the depletion of resources and the environment in a 'Net Ecological Domestic Product'.[718] At the Rio Summit, environmental accounting gained further international attention through the *Agenda 21* resolution and its recommendation that countries should 'expand existing systems of national economic accounts in order to integrate environmental and social dimensions in the accounting framework, including at least satellite systems of accounts for natural resources in all Member States'.[719] Following the Rio Summit, the United Nations Statistical Division released the *Integrated Environmental and Economic Accounting* handbook.[720] The World Bank also released reports in the 1990s arguing that environmental accounting, as a tool, was needed to overcome 'market failures' and 'policy failures' caused by economic development.[721] Two World Bank consultants, Kirk Hamilton and Ernst Lutz, claimed in a 1996 report that environmental policy failures resulted from the 'under-pricing of natural resources, and subsidies on energy, fertilisers and pesticides that lead to negative impacts on the environment'.[722] Market failures, the report stated, were those 'economic activities' that 'impose[d] costs on others, in the form of pollutants carried downwind or downstream for instance, without any mechanisms for remediation'.[723]

All these accounting initiatives can be described as 'green GDP'. The ecological modernisation basis of green GDP derives from situating economic development within environmental parameters. The World Bank review of green GDP also reveals that by the late 1990s the international foundation had been set for developing countries to explore green GDP as a measurement tool to set their environmental policy agenda. Indeed, in 1998, Statistics

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[718] OECD. 2008. "Measuring Material Flows and Resource Productivity," https://www.oecd.org/environment/indicators-modelling-outlooks/MFA-Inventory.pdf. Accessed 15 March 2018.
[719] See Section 8.42 in UNCED. 1992. "Agenda 21: United Nations Conference on Environment and Development Rio de Janerio, Brazil, 3 to 14 June 1992," United Nations Sustainable Development, https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf. Accessed 11 May 2018.
[720] UN Statistical Division 1993.
[721] Hamilton, Kirk and Ernst Lutz. 1996. "Green National Accounts: Policy Uses and Empirical Experience," World Bank, July, http://documents.worldbank.org/curated/en/492681468758369758/Green-national-accounts-policy-uses-and-empirical-experience. Accessed 11 May 2018; World Bank 1997.
[722] World Bank 1997, 40.
[723] Hamilton, Kirk and Ernst Lutz. 1996. "Green National Accounts: Policy Uses and Empirical Experience," World Bank, July, http://documents.worldbank.org/curated/en/492681468758369758/Green-national-accounts-policy-uses-and-empirical-experience. Accessed 11 May 2018.

Norway partnered with China's National Bureau of Statistics (NBS, 国家统计局) on the Sino-Norwegian Project on Environment Statistics and Analysis.[724]

The early discussion of a green GDP in China. The first instance where the Chinese government showed its willingness to consider a concept such as green GDP occurred in 1992 when the State Environmental Protection Bureau (SEPB) first raised natural resource accounting in its *Ten Countermeasures for China's Environment and Development.*[725] In this report, which was released in preparation for the Rio Earth Summit, the SEPB called for the incorporation of 'natural resource accounting' (自然资源核算) within the 'national economic accounting system'. The SEPB then argued that 'when conditions are ripe, China must establish a complete national natural resource accounting system' that calculated the levels and yearly changes of its resources.[726] However, the report did not advocate at this early stage the inclusion of pollution indicators to adjust GDP, despite the fact that some officials had already pointed to the environmental impact of pollution and waste (see Chapters Five and Six). This omission was probably due to the status of GDP in China. While the NBS had trialled GDP in provinces from 1985 onwards, they only measured national economic performance through calculating physical production. The State Council had only decided to adopt GDP as China's official economic and developmental indicator system in 1993 once the CCP had approved the guiding principle of a 'socialist market economy' at the Third Plenum of the 14th Party Congress.[727] That year the Chinese adopted the United Nations' System of National Accounts.

In the late-1990s, once GDP had become the key economic indicator for policymakers, Chinese academic and research institutes began to pay more attention to green GDP. One of the more prominent essays written during this period was by Lin Pi 林丕 from the CCP's Beijing Party School. His 1997 essay published in *Expanding Horizons* argued that China needed:

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[724] Alfsen et al. 2006, 32; Raunch and Chi 2010.
[725] "Woguo huanjing yu…" 1992.
[726] Ibid, 6.
[727] See Chapter Four.

> to change to a new national economic accounting system with green GDP as the core indicator. In simple terms, it is necessary to replace the main assessment indicators for economic construction and replace GDP with "green GDP" as the main "conductor" (指挥棒) for future economic construction work'.[728]

Lin took this view because GDP in its present state could not change cadre behaviour towards economic development. He framed green GDP as a necessary 'new assessment index' that would 'force economic leadership agencies and leading cadres at all levels to abandon traditional high-consumption, high-pollution economic growth methods'.[729] He reasoned that if the government 'strictly implemented' green GDP, and high-levels of green GDP were rewarded by 'political superiors', then cadres would:

> take further scientific and advanced economic and technological measures to protect natural resources and ecological balance better, minimise environmental pollution, and truly establish economic development's rational use and take the lead in implementing low-consumption, low-pollution economic growth'.[730]

Lin's comments were an early demonstration of how ecological modernisation ideas were starting to influence some policymakers in their support for green GDP. This influence stems from a belief that decentralised environmental governance encourages improved environmental performance.[731] As noted in Chapter Two, since the early-1980s China had created various local environmental protection bureaus, but they all suffered from lax enforcement, which led to poor environmental outcomes that ran counter to the policy wishes of environmental protection authorities in Beijing.[732] In this way, green GDP was seen by Lin as a means by which central authorities could improve their environmental governance systems at the local level. Lin saw green GDP as a necessary tool that would force local Chinese officials to behave in a more environmentally sustainable manner because their political achievements would be linked to an ecological-economic indicator such as green GDP.

Chinese academics also entered into the discussion over how to quantify green GDP. In a widely-cited article in *Statistical Research*, Renmin University economist Liao Mingqiu 廖明球 canvassed new ideas for measuring green GDP. Liao believed that green GDP could deduct 'the losses caused by the depletion of resources and the degradation of the environment'. It could take into account the economic 'losses' (损失) for air, water, and solid waste emissions

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[728] Lin Pi 1997, 21.
[729] Ibid.
[730] Ibid.
[731] See Chapter Three.
[732] Jahiel 1998.

as well as noise pollution.[733] His article presented formulae to account for possible costs, including governance and treatment costs.

These academic discussions over green GDP occurred in the post-Rio environment while senior Chinese officials were openly questioning whether the newly-instituted GDP (and Gross National Product) indicators should act as the sole measures of progress and well-being. It had not taken long for China's environmental bureaucrats and legislators to find fault with the myopic nature of GDP as a measurement. Qu Geping, in his new position as the chief legislator for environmental policy in the National People's Congress (NPC), understood that the narrow accounting variables in GDP rendered it too simplistic for environmental policy. In a 1995 article that criticised 'traditional development', Qu noted that GDP 'used industrial growth as the only symbol of development and regarded the industrialisation of a country and its resulting industrial civilisation as the symbolic realisation of modernisation'.[734] If GDP were the only guide for development, he argued, then 'the ardent pursuit of GNP and high-growth goals' would be the fundamental objectives for national economic development. However, such a 'one-sided GNP growth development strategy' would 'result in serious consequences' such as 'a rapidly deteriorating environment, increasingly scarce resources, and the real decline in people's welfare'; development would become 'unmanageable and get bogged down in difficulties'.[735] Here, Qu presented an implicit ecological modernisation interpretation of China's economic development. Reliance on institutional instruments such as GDP would present continued policy obstacles for future environmental protection in China. China's leaders required a more realistic metric to ascertain the status of sustainable development. Like his earlier debate over cleaner production canvassed in Chapter Five, the issue was whether Qu's ecological rationality would prevail over the traditionally dominant economic rationality.

The State Environmental Protection Administration and green GDP. With the overall institutional focus in China starting to focus on the perceived flaws of employing GDP as a measure of Chinese development**,** SEPA researchers turned their attention to green GDP. As the last two chapters outlined, the SEPA was integral in promoting the early ecological

[733] Liao Mingqiu 2000, 21.
[734] Qu Geping 1995, 3.
[735] Ibid.

modernisation discourse that underpinned cleaner production and a circular economy. As well as internal pressure within environmental bureaucracies and academics, the World Bank also supported the impetus for this new interest in green GDP through partnering with the SEPA on several projects centred on the environmental costs of development in China.[736] Cao Fengzhong from the SEPA's Environment and Economic Policy Research Centre was a prominent SEPA researcher who published articles on green GDP. In a 1999 article published in *Environmental Science Trends*, he conceded that government planners needed GDP-like metrics in order 'to analyse and to judge the actual operation of the economy when implementing macroeconomic regulation and control'.[737] However, Cao also argued that China should no longer 'rely solely on traditional GDP indicators'.

In a co-authored article published in *Macroeconomic Management* three years later, he further elaborated on the problem with GDP indicators, stating that they only 'pay attention to the direct costs and added value of one's development', a situation he believed would 'bring about a so-called "market failure" (市场失灵)'. Instead, Cao and his colleague argued that China needed to 'gradually consider utilising "green indicators"' (绿色指标):

> Taking "green GDP as a measure of economic growth" could effectively restrain the expansionary impulses of various economic actors and provide a sustainable internal driving force for economic growth. Increasing "green indicators" is conducive to accelerating the transformation in modes of economic growth. The transformation in modes of growth does not only mean technological progress but, at a deeper level, a more harmonious relationship between man and nature. The concept of green GDP reflects this tendency.[738]

Cao's remarks adopted a reflective ecological modernisation reading of China's development. He saw green GDP as an integral element in providing ecological rationality for policymakers, because 'traditional accounting indicators' had ignored the negative externalities of industrialisation and development.[739]

Senior officials within the SEPA also began championing green GDP in their public commentary. In particular, Pan Yue supported the policy case for green GDP in 2003 in his

[736] Yu et al. 2006, 4.
[737] Cao Fengzhong 1999, 4.
[738] Cao Fengzhong and Tian Jinchen 2002, 29.
[739] Ibid.

new position as deputy director at the SEPA.[740] Pan Yue's early career was different from many senior-level bureaucrats featured in this thesis. As noted in Chapter Three, Pan trained as a newspaper journalist before transferring into government policymaking positions. His most senior position before transferring to the SEPA was deputy director at the State Council's Reform Office. While he focused on economic issues during his time at the State Council's Reform Office, his interest in environmental issues dated back decades. In 1986, as a journalist for the *Economic Daily*, Pan wrote a critical report on the polluted Dianchi Lake in Yunnan.[741] He would remain at the SEPA and Ministry of Environmental Protection (MEP) until 2015 when he left to take up a position in the Central Academy of Socialism.[742] In 2017, he was selected as an alternate member in the CCP's Central Committee, and thus his interest in environmental issues reached new politically influential audiences as he rose through the Party organs. The following discussion will focus primarily on Pan Yue as he was the highest ranking SEPA official leading the call for green GDP.

Pan's backing of green GDP stemmed from the view that China's environmental pollution and degradation were worsening, and new policy ideas were needed to achieve sustainable development. In a 2005 speech at a Wealth and Globalisation Forum titled 'Distorted Viewpoint of Development: The Origin of China's Environmental Problems', Pan enumerated many of the environmental problems caused by China's development. Although this speech came a year after he first fully articulated his vision for establishing green GDP, it provided his most candid comments on the state of China's environment.[743] Pan lamented that while China's economic development was a significant achievement, the environment had remained a secondary consideration. For example, he outlined a litany of environmental woes and pressures that China faced, such as its population doubling to 1.3 billion people; soil erosion destroying nearly half of China's soil cover (reducing it from 6 million square kilometres to 3 million square kilometres); its reserves of primary minerals reducing from 45 to just 6 over the

[740] Pan Yue was mentioned in Chapter Four concerning the increased professionalisation of Chinese bureaucrats.
[741] Souhu xinwen. 2016. "Panyue ren zhongyang shehui zhuyi xueyuan dangzu shuji, di yi fu yuan zhang" (Pan Yue to serve as Party Secretary and First Vice President of the Central Institute of Socialism), 3 April, http://news.sohu.com/20160304/n439369797.shtml. Accessed 16 June 2019.
[742] Chinese name is 中央社会主义学院.
[743] Pan Yue 2005a.

past fifteen years; China's dependence on over 70 per cent of its oil from imports in the next five years; one-third of China's land experiencing acid-rain pollution; 40 per cent of its rivers being unfit for drinking (referred to as 劣Ⅴ类); 300 million rural citizens unable to drink 'safe water' (安全的水); 400 million urban residents breathing 'seriously polluted air'; and 15 million Chinese citizens experiencing 'bronchial and respiratory cancers'.[744] Pan's list shows that he was well aware of the significant cost that China's development was having on its environment. Moreover, as the following discussion illustrates, this list outlines that many of the environmental problems that had influenced Chinese policymakers to incorporate cleaner production and circular economy into China's environmental policy agenda were influencing Pan's support of green GDP.[745]

Pan Yue also engaged in self-criticism, reflecting on his own past mistakes when he was involved in macro-economic policy reform in the State Council Reform Office. Pan confessed that while he championed how China had become the 'world's factory' (世界工厂), he had failed to mention that the environmental cost of that role within the global economy was that China became the 'world's garbage dump' (世界垃圾场).[746] Pan's confession provides a stark example of how a growing ecological rationality was beginning to rival the established economic rationality. He noted that over the past 15 years, China's GDP had 'more than doubled', while its 'pollution load' (污染负荷) had 'probably increased by four to five times'. He singled out the energy industry, noting that coal combustion in 1997 caused the production of 'eight kinds of air pollutants' and that 'over the past 20 years the air pollution situation had worsened'. Attempting to head off any complacency that some officials might display towards the environment, he stressed that China's environmental problems were an 'immediate crisis' rather than a 'vaguely approaching crisis'.[747] In other words, this was not an act the government could postpone until China became more economically developed.

Pan believed that a broad shift in the Chinese mindset was now critical to achieve sustainable development. As a result, he promoted a new 'environmental morality' and culture

[744] Ibid, 9.
[745] See Chapter Five and Chapter Six.
[746] Ibid.
[747] Ibid.

in China during his early days at the SEPA. In particular, Pan called for China to transition away from a 'traditional industrial civilisation' (传统工业文明), which had characterised Western-led development for 'the past 300 years', towards an 'environmental culture' (环境文化).[748] He reflected on traditional development in similar terms to Qu Geping:

> Traditional development had led to the rapid development of a scientific and technological economy, bringing about a tremendous increase in the level of human material livelihoods. However, its inherent flaws also have become increasingly exposed: it controls and plunders, consumes global natural resources at an alarming rate, emits large amounts of waste that the natural world cannot absorb, and breaks the natural circulation and self-balancing of the global ecosystem. The deterioration of the relationship between man and nature has created a growing environmental crisis that threatens the survival and development of humanity.[749]

He viewed China's environmental problems as existential: 'economic crises are temporary and often impact for just short periods, rather than ecological crises which are long-term; once large-scale irreversible environmental damage occurs it will fundamentally threaten a nation's existence'. Pan considered that China's turn to sustainable development resulted from 're-examinations' (重新审视) and 'reflections' (反思) on past economic development.[750] The language he used strongly indicates a convergence of economic and ecological rationality in his interpretation of China's development. On the one hand, he appreciated how China's traditional development had increased material livelihoods and provided social benefits, but on the other hand he considered that this traditional economic development unsustainably disrupted the delicate ecological balance in China.

To support this shift in consciousness towards an 'environmental culture', Pan referred to classical Chinese philosophers, positioning China's environmental problems within China's broader intellectual history. He noted how 'Chinese environmental culture inherited and evolved from Chinese traditional culture', by noting that Confucianism, Daoism, Laoism and Buddhism can contribute to environmental thought. For instance, Confucians discussed 'harmony between man and nature' (天人合一), and Daoists promoted the 'follow the laws of nature' (道法自然) principle.[751] Pan believed that the Classical Era provided many examples which China's contemporary decision makers could follow:

> China has long had its own "environmental culture." In the Xia Dynasty 4,000 years ago, it was stipulated that trees should not be cut down in spring, and fishing was outlawed in summer. It was also forbidden to kill young beasts and obtain eggs. In the Zhou Dynasty 3,000 years ago, hunting birds, fishing, felling trees, and burning were strictly regulated according to climate seasons. In the Qin Dynasty 2,000 years

[748] Pan Yue 2003, 125.
[749] Ibid.
[750] Ibid, 125-129.
[751] Ibid, 126.

> ago, it was forbidden to collect newly sprouted plants in spring, the capture of young beasts, and the poisoning of fish was prohibited. In the past dynasties of China, there were clear regulations and bans for environmental protection. The cause of China's environmental protection today inherits and develops on the spirit of Chinese traditional culture's harmony with nature.

As noted in Chapter Two, Mark Elvin has highlighted how the imperial period in China was characterised by environmental deterioration, but the accuracy of Pan's statements is not the focus here. The important point is that Pan believed that Chinese policymakers could draw on the ancient examples of 'environmental culture' to find solutions to the 'contradiction between traditional industrial modes of economic growth and the environment'.[752]

In the contemporary context, Pan believed that the diffusion of environmental norms and morality needed to enter into economic thinking. In a 2005 speech to a business leaders forum, Pan called for the Chinese industry to 'take the green road of sustainable development'. He argued that now Chinese companies had benefited from the policy of 'let some people get rich first' (让一部分人先富起来、先富带动后富), they had the 'green responsibility' (绿色责任) of creating a 'harmonious society' (和谐社会) through making their respective industries green.[753] His call for 'green' companies is consistent with the ecological modernisation position that market agents are integral to environmental reform.

Moreover, he argued that for China to prevent future environmental crises, and reduce current environmental problems, it 'must depend on the "greenification" (绿色化) of laws and morals'.[754] The rationale behind this strategy of environmental morality, Pan claimed, was the enhancement of the government's 'green control capability' (绿色控制能力) through improving education, environmental legislation, environmental impact assessments and instituting a 'green national accounting system'.[755] Drawing on questions of 'morality' (道德), Pan argued that officials and citizens needed to become more attuned with the needs of the environment:

> The construction of an environmental culture requires the realisation of similar legal and ethical systems. Viewing "morality" (德) from the perspective of environmental culture is consistent with the principle that natural laws are the guidelines for conscientious behaviour.[756]

In setting forth this vision of 'environmental morality', Pan argued that the government needed to step in and foster a cultural transformation, since China's politics, industry and society would

[752] Ibid, 127.
[753] Pan Yue 2005b, 12.
[754] Pan Yue 2003, 131.
[755] Ibid, 128.
[756] Ibid, 130.

not spontaneously develop this. It required the government to hasten ecological awareness and help embed an ecological rationality within the broad collective psyche of the nation. This hastening would involve further strengthening of laws to prevent environmental law infringement. Pan remarked how, even after the promulgation of such laws like the *Cleaner Production Promotion Law* in 2003*,* China still experienced 'the serious phenomena of legal non-compliance and lax enforcement' of this law. This weak enforcement stemmed from the 'lack of a sufficient environmental moral culture' to support this and other environmental protection laws.[757]

The other element of Pan's vision of an environmental culture involved lifting the secrecy that had typified Chinese politics and governance and introducing greater transparency:

> The public has the right to know about environmental issues, including the right to know about any environmental crises that occur, having the right to oversee public projects that affect the environment and having the right to participate in strategic decisions involving environmental security. Without the broad participation of the people, the cause of environmental protection will become a minority issue. As a result, nothing will be done. Therefore, environmental protection work must establish transparent and open mechanisms. It is necessary to establish a clear channel of public opinion and suggestions so that all actions which damage the environment are supervised, and so that all actors (whether enterprises or government departments, individuals or collectives) can only operate with a framework allowed by natural and societal laws.[758]

This emphasis on open government was a legacy of Pan's experience as a journalist at the *China Environment Newspaper*, where he saw the positive role that transparency played in reducing the environmental impact of rapid industrialisation during the 1980s. Reflecting on his time as a journalist, Pan noted that he 'almost ruined' his journalistic career due to his reporting of illegal discharges of industrial pollution into the Dianchi Lake. However, Pan revealed that he 'did not regret this experience' because it drew attention to the illegal fouling of a culturally and environmentally significant environment.[759] On the one hand, Pan's comments reflect a utopian take on openness and transparency in modern China. Two years after he wrote this article, information concerning the chemical factory explosion on the Songhua River in Jilin was suppressed by the CCP Propaganda Department.[760] On the other

[757] Ibid.
[758] Ibid, 131.
[759] Bian Yizu. 2015. "Pan Yue: cong huanjing jizhe dao huanbao bu fu buzhang" (Pan Yue: from environmental reporter to deputy minister of the Ministry of Environmental Protection), iFeng, 4 August, http://news.ifeng.com/a/20150804/4434 6478_0.shtml. Accessed 23 June 2019.
[760] Jiang 2011, 123.

hand, the actions of the SEPA[761] in providing further environmental information disclosure over the past decade and a half demonstrates that many policymakers within SEPA believed that such measures formed an important part of an ecological modernisation-strategy to improve China's decentralised environmental governance.[762]

Pan Yue's comments in the short time he was at the SEPA at the beginning of the new millennium clearly suggest that an ecological modernisation perspective guided his reasoning. First, he believed that environmental technology was an integral element of any future economic growth in an environmentally sustainable China. Second, he believed that China's sustainable development strategies originated from its 're-examination' and 'reflection' on their past modernisation. Third, Pan's comments mirror the ecological modernisation view, touched on in Chapter Five, that the government could only do so much through command-and-control measures, and that non-state forces, whether markets or morality, had a role to play in the restructuring of China along more environmentally sustainable lines. Fourth, he emphasised the need for a broader societal-cultural shift through the raising of environmental awareness. Fifth, the environmental reforms proposed by Pan illustrate that differences existed within China's ecological modernisation discourse. While most officials featured in the two preceding chapters primarily focused on the technological and market aspects of ecological modernisation, Pan saw the crucial role that non-state actors can perform in a decentralised environmental governance system.

Through examining the work of Pan Yue, it is also possible to gain greater insight into the foreign source of his inspiration for green GDP. He cited the original Norwegian experience in 'resource environment accounting' (资源环境的核算), noting that Norway established an inventory system that accounted for 'mineral resources, biological resources, water resources (hydropower), environmental resources, land, air pollution, and two types of water pollutants (nitrogen and phosphorus)'. Pan also stressed that Norway's environmental accounting system 'laid an important foundation for the green GDP accounting system'. He suggested that Norway's inclusion of oil in its accounting system presented a possible example to follow to help China account for its own resource reserves and consumption.[763] Reviewing Mexico's

[761] And its bureaucratic successors.
[762] Wang 2018.
[763] Pan Yue 2004a, 39.

experience with green GDP, as well as other developing nations such as Indonesia, Thailand, and Papua New Guinea, Pan noted that the 'experience of developing countries was of greater reference for China'. The role of the World Bank and its 1995 report *Expanding the Measure of Wealth* also were lauded for employing the concepts of 'natural capital', 'productive capital', 'human capital' and 'social capital' to provide a 'broader meaning of "wealth" (财富)'.[764] In fact, in 2003, China would partner with the World Bank on the Research Project on the Establishment of a Green National Accounting System of China (with funding assistance from the Italian government). The World Bank provided technical expertise that would assist the SEPA to undertake green GDP pilot projects across China.[765]

Inspired by the examples of foreign environmental reform and his ecological modernisation outlook, Pan argued forcefully for adopting green GDP, and this encouraged the SEPA to partner with the NBS to create a 'Green GDP Joint Task Force' (绿色 GDP 联合课题小组) in 2003 to research the feasibility of a new environmental-economic accounting system. To reinforce his case for green GDP, Pan published several articles in 2004 across multiple journals that echoed Qu Geping's earlier criticism of GDP; namely that it was 'purely a concept for economic growth…that did not calculate environmental pollution or ecological destruction and did not reflect the sustainable nature of economic growth'. He pointed to the irrationality of GDP calculations that reward environmentally unsustainable behaviour, noting in the case of unsustainable logging that because it commanded a price, it was 'incorporated into GDP statistics'. Such unsustainable logging led to deforestation, which severely impacted forestry ecosystems. Pan noted that the disruption of forest habitats could 'lead to the extinction of mammals, fishes, and microbes' that were integral to the ongoing functioning of those ecosystems (i.e. positive effects on ecosystem services).[766] With the introduction of a green GDP system, China would have an index system that could account for 'this loss' and therefore would possess a more accurate picture of the status of China's environment. In making his case, Pan linked green GDP to sustainable development, circular economy and cleaner production, seeking to place green GDP firmly within China's turn towards ecological

[764] Ibid.
[765] Gov.cn. 2006. "Green GDP Accounting Study Report 2004 issued," 11 September, http://www.gov.cn/english/2006-09/11/content_384596.htm. Accessed 18 January 2019.
[766] Pan Yue 2004a, 39; Pan Yue 2004b; Pan Yue 2004c.

modernisation reforms. Pan's critique of GDP, and his belief that government policy could reshape society represented a powerful advocacy platform for 'comprehensive indicators for cadre evaluation and the establishment of a green GDP accounting system'.[767]

However, Pan realised that local officials would 'resist' this new green GDP indicator because it ran counter to the economic-based metrics they had experienced previously:

> In the past, the achievements of individual cadres' performances were purely measured by GDP growth. Now we must combine economic growth with social development and environmental protection. Many cadres will be unable to understand this [change], and therefore, it will create resistance. However, any conceptual change has a gradual and challenging process… It is an innovation that makes both fairness and efficiency win-win. It also is a significant refinement to our theories of a socialist market economy.[768]

To counteract potential resistance, Pan attempted to frame green GDP as mutually beneficial to the economy and the environment. He also sought to place it ideologically within the discourse of a 'socialist market economy'. Administratively, he also foresaw that 'it could be imagined that with the research and implementation of green GDP, the protection or destruction of the environment will become an essential criterion for the selection of cadres'.[769] However, this optimistic perspective failed to consider the mindset of 'actually-existing' cadres. Their grounds for resistance will be examined in a later section of this chapter, as it reveals important limits to ecological rationality in China.

The National Bureau of Statistics and green GDP. The SEPA was not the only Chinese government agency interested in this new ecological and economic accounting concept. By the mid-1990s, the NBS, China's principal statistical agency, also started exploring how that agency could better measure the economic losses which resulted from environmental pollution. With this in mind, the Division of Resources and Environmental Accounting was established in 1996 within the NBS's Department of National Accounting. Two years later, the NBS partnered with Statistics Norway on the Sino-Norwegian Project on Environment Statistics and Analysis. Soon after, the NBS started to publish material that quantified the environmental cost of economic development. Deputy Director Qiu Xiaohua 邱晓华 was one leading official who sought to quantify the economic losses that resulted from China's industrial pollution. Qiu was an economist who graduated from Fujian's Xiamen University in the early 1980s before studying international finance at Stanford University in the USA. After returning to China, he

[767] Pan Yue 2003, 129.
[768] Ibid, 127-128.
[769] Ibid, 127.

took up a position within the Chinese Academy of Social Sciences (CASS) and then later at the NBS. In a 1998 article, Qiu and a colleague reviewed a variety of theoretical assessment models of environmental pollution that calculated economic losses. Their review did not evaluate China specifically, but they concluded from their research that there needed to be 'unified evaluation procedures and calculation methods to better control pollution and promote better governance'.[770] Qiu would go onto partner with Pan Yue at the SEPA to undertake a 'green GDP evaluation' of China's economy and environment to provide the statistical expertise that would make this new national accounting framework a reality.[771]

From 2000 onwards, NBS policy researchers began commenting on green GDP publicly. For example, Cao Keyu 曹克瑜 in a 2001 article in the *Review of Economic Research* claimed that 'national economic accounting had not fully reflected the relationship between the economy, resources and the environment'.[772] The problem with GDP, Cao argued, was that it treated 'natural resources and the environment as completely separate from the economic system', thus making its accounting methodology 'biased' and 'unable to be objective'. He stated that this lack of objectivity had implications for policymaking because biased GDP statistics would 'mislead decision-makers'. He believed that these policymakers needed to take into consideration how GDP-centred economic growth 'mainly relied on natural resources, to…obtain employment, fiscal revenue, and foreign exchange income'. In his view, prioritising GDP growth would encourage policies that 'led to excessive natural resource consumption and "external diseconomies" (外部不经济)'.[773]

Even former NBS cadres echoed this support for 'green GDP'. The former NBS Director Li Chengrui 李成瑞 remarked in an opinion piece in *China Statistics* that China needed to understand the 'historical inevitability and important role' that green GDP would have on its development strategy.[774] The entrance of these economists and statisticians into the green GDP policy discussion reflected how ecological modernisation ideas had gained powerful support within economic agencies. It appeared that green GDP was on the rise within official discourse.

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[770] Shen Defu and Qiu Xiaohua 1998, 3.
[771] Discussed in a later section of this chapter.
[772] Cao Keyu 2001, 22.
[773] Ibid, 21.
[774] Li Chengrui 2001, 6.

The political rise of green GDP in China. Although Pan Yue (and Qiu Xiaohua) drove the debate concerning green GDP, like the circular economy the concept had support in both the economic and environmental sectors of the government. For instance, in 2005 then SEPA Director Zhou Shengxian 周生贤 and his predecessor Director Xie Zhenhua (who had been transferred to a vice-director position in the NDRC after the Songhua River chemical plant explosion at Jilin) both championed green GDP in 2005 as an essential principle for furthering China's sustainable development in a series of speeches and articles.[775] Officials within the powerful NDRC also saw the merits in green GDP. A year earlier, in a 2004 article, Director Ma Kai discussed the need to adopt circular economic principles and the 'necessity of including an improved statistical accounting framework' that included 'resource costs and environmental costs'. However, Ma Kai still supported the measurement of GDP, believing that it was 'an important indicator that reflected the economic scale and economic strength of a country; it also was an important foundation for the country to 'formulate macro-control policies'.[776] Yet, importantly, he also acknowledged it had some serious 'limitations' (限制):

> GDP mainly reflects the "output" (产出), "total amount" (总量) and "quantity" (量) of economic growth in a specific country (region) for a specified period. It does not or cannot reflect its "investment" (投入) (mainly, the price of resource costs and environmental costs), the "structure" (结构) (including the distribution of social wealth) and "quality" (质) (include the quality of products, services, and social benefits, etc.). In the case of various shortcomings in GDP accounting, only using GDP to assess the development achievements of a region and assessing the achievements of leading groups is biased, and it is easy to cause some localities to pursue growth at all costs regardless of structure, quality, and efficiency, ignoring ecological construction and environmental protection.[777]

Ma Kai's views provide further illustration of how the developmental section of China's bureaucracy was adopting a more ecological modernisation mindset to China's economic and environmental challenges.

With broad support in the Chinese government for the implementation of a green GDP, the SEPA and the NBS released their joint *2004 Study Report for Green National Economic Accounting*, which was the fruition of their joint task force that they formed three years earlier.[778] This report, compiled under the leadership of Pan Yue and Qiu Xiaohua, promoted

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[775] See, for example, Xie Zhenhua 2005a, 13; Zhou Shengxian 2005, 4.
[776] Ma Kai 2004a, 6.
[777] Ibid.
[778] Guojia huanjing baohu zongju he guojia tongji ju. 2006. "Zhongguo lüse guomin jingji hesuan yan jiu baogao 2004 (gongzhong ban)" (China green national accounting study report 2004), http://www.caep.org.cn/yclm/hjjjhs_lsgdp/ tx_21977/200609/W020180921435930059839.pdf. Accessed 14 May 2017.

a new official direction for China's national accounts that had traditionally placed importance solely on economic growth. According to the 'public' (公众版) version of the report, following the example of Mexico, green GDP consisted of placing a value on various aspects of the environment, through 'environmental physical accounting', to provide a fuller description of economic activity that incorporated the value of producing, removing, and discharging pollution.[779] The ultimate aim of this green GDP report was to adjust 'GDP calculations' to account for 'environmental pollution'.[780] Within the report's limited scope of 'economic loss due to environmental pollution', the report calculated the estimated economic losses at approximately 51.18 billion yuan – around 3.05 per cent of GDP. Moreover, the 'hypothetical management costs' (虚拟治理成本) of this environmental pollution was around 1.8 per cent of GDP at 28.74 billion yuan. In addition, green GDP would expand from environmental pollution to also include 'ecological damage' under the rubric of 'environmental degradation costs' (环境退化成本).[781]

For example, the report included the electricity industry in its calculations of green GDP. The report detailed how 'the industrial sector emitted 2173.2 million tonnes of sulphur dioxide, of which the sulphur dioxide emitted from the power industry accounted for 63 per cent'. Besides, it revealed that 'a total of 8.866 million tonnes of smoke and dust were emitted from the industrial sector, [including] 5.594 million tonnes from the electricity industry…[and] the total emission of NOx [nitrogen oxide] in the industrial sector was 13.093 million tonnes, which was mainly concentrated in the power and steel industries'.[782] The two leading authors of the report, Pan Yue and Qiu Xiaohua, acknowledged that the accounting techniques used to calculated green GDP were in their early stages and that there were 'organisational, technological…[and] statistical limitations' which would be overcome in subsequent reports.[783] Pan had foreshadowed those problems in a 2005 article, noting that although GDP was simplistic in how it accounted for 'market transactions' (市场交易), green GDP with further research would overcome these 'difficulties' (困难).[784] In particular, Pan and Qiu

[779] Ibid, 1.
[780] Ibid, 1-2.
[781] Ibid, 1.
[782] Ibid, 3.
[783] Ibid, 1.
[784] Pan Yue 2005a, 7.

argued that the statistical limitations would be overcome with a more 'complete green GDP calculation' through including the 'resource depletion costs' associated with the agricultural, forestry, mining, water and fishery sectors. In an article released to promote the report, Qiu again noted these limitations, stating that 'if both resources and environmental factors are accounted for' then the adjusted percentage of losses from development would 'certainly be much higher than 3.05 per cent'.[785]

The discussion so far has illustrated that green GDP signified an ambitious ecological modernisation concept for Chinese officials. Its proponents sought to converge economic and ecological rationality within a key national metric of development. In this way, green GDP represented a progression from the other ecological modernisation concepts discussed in past chapters. Pan Yue's earlier promotion of an 'environmental culture' demonstrates that green GDP was an institutional attempt to create a new 'morality' fashioned according to environmental principles and which understood that China's environment had strict 'limits' (限制). Moreover, although many China watchers argue that the green GDP adjusted-figure in the *2004 Study Report for Green National Economic Accounting* drastically underemphasised the environmental costs of China's development[786], its supporters included many of the influential senior bureaucrats in both the environmental and economic sections of China's government, reflecting the power of ecological modernisation ideas to drive environmental reform in China.

The political decline of Green GDP. When assessed alongside the passage of the *Cleaner Production Promotion Law* and the draft *Circular Economy Promotion Law*, it would seem that the bureaucratic support for green GDP would have been sufficient to establish it as an ecological-economic indicator for the Chinese government. However, even with the support of the senior officials within the NDRC, green GDP languished as an idea and the SEPA and the NBS never published another green GDP report. Indeed, the most critical green GDP studies would only be circulated to senior officials within restricted internal reference channels.[787] The failure of green GDP to become institutionalised raises the question whether green GDP was different to other ecological modernisation concepts such as cleaner production and circular

[785] Qiu Xiaohua 2006, 10.
[786] Raunch and Chi 2010, 7; Economy 2010, 92.
[787] Chapter 13 in Pilling 2015.

economy. The 'official' line on the progress of green GDP states that provinces and local government officials had concerns over the methodology it used. Graeme Li and Vic Lang noted that many cities that partnered with SEPA and NBS's green GDP pilot schemes 'complained about the validity and soundness of the measuring scheme', with many of these cities threating to withdraw from the study or asking the SEPA and NBS to refrain from publicising their green GDP results.[788]

Another interpretation of events focuses on the innovative aspects of green GDP within the context of China's turn to ecological modernisation solutions. China's policymakers focused on instituting a metric that would shape the morality or behaviour of government cadres. Green GDP was the most audacious attempt by China's senior environmental protection agency to converge economic rationality with ecological rationality along its party-state chain of command. In seeking to understand the demise of this concept, Li and Lang place its demise in the hands of China's political regime and their fears of stepping off the 'treadmill of production':

> the tension between ecological modernisation and the imperatives of the treadmill of production is well illustrated by China's green GDP exercise. The ecological modernisers faced determined multi-level resistance from those firmly committed to the treadmill and, up to the present, high economic growth is more closely linked than ecological modernisation to regime-legitimacy and the main-stream collective visions of economic prosperity.[789]

Alternatively, its failure has been attributed to bureaucratic infighting between SEPA and NBS over the content and format of the reports, resistance from powerful central institutions and provincial authorities, and the relative bureaucratic weakness of the SEPA.[790]

The opaque-like qualities of Chinese politics render it challenging to provide a clear-cut answer. However, the discussion provided in this chapter suggests that the challenge of green GDP to economic rationality through an innovative ecological modernisation solution that sought to introduce an ecological rationality for government cadres would lead to its eventual political demise due to a backlash from those very cadres whom it sought to shape. A change in mindset was its objective. As the earlier examination of Pan Yue highlighted, one of the reasons why he supported a green GDP was due to his belief that this accounting tool would have forced cadres to more faithfully implement central initiatives such as the *Cleaner*

[788] Li and Lang 2009, 52.
[789] Ibid, 57.
[790] Ibid; Steinhardt and Jiang 2007.

Production Promotion Law. New updates to green GDP could also have incorporated new indicators such as 'environmental degradation', allowing for a more accurate record of the environmental costs of China's economic development.

It is this innovation that meant implementing green GDP was a 'bridge too far' within the context of the environmental reform measures between the early 1990s and the late 2000s. Chinese legislation sought to 'promote' (促进) cleaner production and a circular economy, but a green GDP would have provided the CCP Organisation Department with an annual account of which provincial, county and town officials had presided over a deteriorated environment. Moreover, it would have provided the Chinese public with a quantification of the environmental price of their modernisation, even if it was a sanitised 'public version'. This point becomes more politically salient when internal research by the CASS published in 2015 revealed that one-third of China's GDP was 'not real'.[791] Green GDP would have opened the government up to more scrutiny. The evidence outlined in this chapter strongly indicates that Chinese policymakers in the SEPA wanted that transparency in line with ecological modernisation ideas. However, seeing as though informal studies of green GDP are kept with internal reference channels, this suggests that China's leaders are less forthcoming and believe that this accounting tool would shed too much light on environmental costs in China.

The policy status of a green GDP. Despite the failure of SEPA and NBS policymakers to implement green GDP, it has experienced in recent years something of a resurgence, suggesting that China's institutions remain open to ecological modernisation concepts such as green national environmental accounting. In 2013, Xi Jinping was reported to have said at the National Organisational Work Conference:

> To improve assessment methods, we must look at both development and foundations. We must not only look at these achievements but also look out for potential achievements. We must take indicators such as improvements in people's livelihood, social progress, and ecological benefits, and performance as essential assessments; no longer can we simply talk about heroes regarding GDP growth.[792]

[791] CASS researcher (Niu Wenyuan 牛文元) interview in Pilling, 2015.
[792] Quoted in Gov.cn. 2016. "Zhengji kaohe xin gui yinling kexue fazhan" (New rules for political performance evaluation leads to scientific development), 23 February, http://www.gov.cn/zhengce/2016-02/23/content_5044812.htm. Accessed 18 June 2018.

With this apparent endorsement of green GDP from Xi Jinping, the MEP took the policy initiative and resumed research into 'green GDP 2.0' in 2015. In a media release, the head of the MEP's Policy and Regulation Department, Li Qingrui 李庆瑞, mentioned that:

> restarting the research program on green GDP accounting 2.0 was a concrete move to implement the spirit of General Secretary Xi Jinping's instructions, which is, to improve the social and economic development evaluation system, incorporate resource consumption, environmental damage, ecological benefits, and other indicators which reflect the progress in developing ecological civilisation, into the socio-economic development evaluation system, and make those indicators play an important, guiding and restraining role in promoting ecological progress.[793]

To overcome the organisational difficulties associated with implementing green GDP nationwide, the MEP selected six provinces – Anhui, Hainan, Sichuan, Yunnan, Shenzhen, Kunming – for a pilot program on green GDP in 2016. These pilot programs were to take into account 'environmental cost and benefit accounting, environmental capacity accounting, ecosystem production accounting'.[794] The renewed impetus for green GDP could reflect the idea of an 'ecological civilisation', an environmental idea that was accumulating political capital from the start of the Xi Administration in 2012 (explored further in Chapter Nine). Overall, the possibility that green GDP could emerge as an ecological modernisation concept parallel to the other concepts discussed in Chapters Five and Six remains a future possibility, but as of yet green GDP 2.0 has not been incorporated into China's environmental policy agenda.

Conclusion: China's Failed Green GDP experiment and Ecological Modernisation Discourse

This chapter has shown that a group of highly influential Chinese policymakers created 'green GDP' in another attempt to integrate ecological modernisation ideas within China's environmental policy framework. Chinese academics first started to discuss green GDP around the mid 1990s as another policy response to China's deteriorating environment. The concept had been implemented in such countries as Norway and Mexico and their experience with the concept gave policymakers from the SEPA and NBS the confidence to consider implementing this new environmental accounting concept in China. Officials from these two government departments justified green GDP using language similar to that employed by other officials

[793] Quoted in Gov.cn. 2015. "Huanjing baohu bu chongqi lüse GDP yanjiu" (Ministry of Environmental Protection restarts green GDP research), 31 March, http://www.gov.cn/xinwen/2015-03/31/content_2840533.htm. Accessed 18 June 2018.

[794] Zhongguo jingji wang. 2015. "Anhui, Hainan, Sichuan deng 7 di shidian lüse GDP hesuan" (Pilot green GDP accounting in seven locations including Anhui, Hainan and Sichuan), 11 August, http://www.ce.cn/xwzx/gnsz/gdxw/201508/11/t20150811_6185604.shtml. Accessed 18 June 2018.

who had supported cleaner production (see Chapter Five) and a circular economy (see Chapter Six). In other words, it aligned with the reflexive narrative of the shift away from 'traditional development' (or a 'traditional industrial civilisation') and towards sustainable development that had characterised China's environmental policy agenda since the Rio Earth Summit.

Environmental bureaucrats criticised the oversimplified aspect of GDP that ignored negative environmental externalities caused by economic development. It was only a couple of years after China had officially adopted the United Nations's System of National Accounts that Qu Geping openly questioned these statistics, stating that while GDP would result in 'the ardent pursuit of GNP and high-growth goals' it would also result in 'a rapidly deteriorating environment' and problems for future economic development.[795] It received backing from bureaucrats in the NBS, as well as support from the NDRC's Ma Kai, a key supporter of implementing a circular economy in China.[796]

Although its primary backers at the NBS and the SEPA (and then the MEP and Ministry of Ecological Environment) failed to establish an ongoing green national accounting system, China's experience with green GDP remains significant for understanding the role of ecological modernisation beliefs within China's environmental policymaking community. Like its associated concepts of cleaner production and circular economy, the backers of green GDP sought to balance both economic and environmental objectives in their policy discussion. Officials within the SEPA and NBS believed that the policy strength of green GDP lay with its capability to include negative environmental externalities that accounting measures such as GDP ignored. Officials such as Pan Yue believed that the measurement of green GDP would only improve with experience, providing a fuller and more accurate picture of the environmental costs of China's development.

However, the ecological modernisation characteristics of green GDP went beyond the mere rhetorical balancing of ecological and economic considerations. Policymakers from the SEPA also wanted to use green GDP to help create a useful tool to refashion an 'environmental culture', reshape environmental governance and provide the central government with more confidence concerning its decentralised system of environmental governance. As highlighted

[795] Qu Geping 1994a, 1.
[796] See Chapter Six.

in Chapters Two and Three, decentralised environmental governance constitutes a critical element of ecological modernisation belief. In the early 1980s, the central authorities devolved substantial responsibility for environmental management to local and provincial environmental protection bureaus. Chinese officials were sometimes open about the governance problems of these moves. In the words of then vice-director of the SEPA Pan Yue, China had experienced 'the serious phenomena of legal non-compliance and lax enforcement'.[797] The fear was that this lax enforcement would only get worse as China continued upon its 'socialist market economy' path and underwent further industrialisation. Through quantifying environmental issues, central environmental bureaucrats wanted to encourage local and provincial governments to take policy objectives beyond the economy into account. Pan Yue's comments in support of green GDP strongly suggested that he believed green GDP could become 'a comprehensive indicator for cadre evaluation' and thus enhance China's 'green control capability'. He believed that green GDP would assist in creating an 'environmental culture' that would bolster the process of ecological modernisation.

The thesis up to this point has shown that the Chinese government was willing to incorporate ecological modernisation ideas into China's environmental policy agenda when it legislated the promotion of cleaner production and a circular economy. However, the failure of Chinese policymakers to incorporate green GDP into China's environmental policy agenda shows that powerful barriers remain standing against the process of creating ecological modernisation in China. However, while these policy responses were being deliberated within the Chinese government, there had been, since the early 1980s, a slowly evolving policy discussion within Chinese policymaking circles as to the threats posed by *anthropocentric climate change* and the need for a 'low-carbon economy'. The next chapter explores this policy deliberation and the Chinese policymakers response.

[797] Pan Yue 2003, 130.

Chapter Eight: Low-Carbon Economy and Climate Change in China

The chapters up to this point have demonstrated how rising anxiety within the Chinese government towards burgeoning air and water pollution, solid waste, population growth and a generally deteriorating environment, led progressively to new legislation with embedded ecological modernisation principles, which encouraged 'cleaner production' and 'circular economic' practices within Chinese industry. New laws conforming with some of the crucial aspects of what I have argued is a version of 'ecological modernisation' have focused on technology and science as the critical path towards a sustainable future. However, the last chapter on green GDP also demonstrated that despite the willingness of senior policymakers to implement ecological modernisation-based policies, embedded economic rationality and other politico-organisational forces among China's political elites have still been capable of scuttling certain efforts. The failure of those promoting green GDP to garner support from the provinces suggests that the incorporation of ecological modernisation ideas within China's environmental policy agenda is not a *fait accompli*.

From the policy failure of green GDP, this chapter turns to the policy concept of a 'low-carbon economy' (低碳经济) with the primary objective of examining whether fostering of a low-carbon economy in China also represents an adoption of an ecological modernisation concept. Although low-carbon economy emerged as a concept in the mid-2000s, this chapter will show that its preliminary discussion originates in the 1980s. The first half of this chapter charts the evolution in the ecological rationality that Chinese policymakers expressed from the 1970s to the 2000s towards the potential threat of climate change and the 'greenhouse effect'. From that historical basis, the latter half of the chapter examines the policy discourse surrounding 'low-carbon economy', focusing in particular on the perspectives of powerful senior Chinese politicians, the Chinese Academy of Social Sciences (CASS), the Ministry of Environmental Protection (MEP) and the National Development Reform Commission (NDRC). The chapter concludes by outlining the current status of this low-carbon concept and its linkage to ecological modernisation. Ultimately, this chapter argues that a low-carbon economy signifies a measured policy response to the threat of traditional carbon-based development. The ecological modernisation solutions proposed share similar technological and market traits to cleaner production, circular economy and green GDP.

The Early Ecological Rationality Towards Climate Change in China

This chapter will start with an examination of the growing ecological awareness within China towards climate change and its environmental effects. It is necessary to trace the history surrounding this consciousness up to the 2000s in order to understand why China's political leadership embraced the notion of a 'low-carbon economy' in 2007. During the 1970s, the discussion in China over climate change was dominated by foreign experts whose research was translated into Chinese for specialist journals, because China at that time had little capacity or expertise for undertaking climate change research.[798] For instance, a report by a meteorologist from the American Institute of Physics Lester Machta[799] to the 1973 World Metrological Organisation Commission for Atmospheric Sciences was considered significant enough for it to be translated and published in the Chinese Academy of Meteorological Science's *Meteorological Science and Technology*. The report declared that 'human activities probably cause climate change' and that 'this is a matter that concerns everybody'. The report also stated that carbon dioxide emissions were the leading cause of climate change: 'most meteorologists believe that the increasing carbon dioxide and turbidity in the atmosphere [i.e. air pollution] is most likely a phenomenon in which humans unintentionally influence global or local climate change'. He supported his statements with data from observation stations worldwide that graphically illustrated the exponential rise in emissions.[800] Later, a 1980 issue of the same journal translated a conference paper by Paul Harycak[801] to a British Environmental Sciences Institute conference. The translated article claimed:

> It was indeed probable that humans caused climate change; this has already occurred on a small scale. At present, the power of human beings to change their environment is increasing, the world is becoming increasingly crowded, and international cooperation is necessary for the future to prevent adverse climate change.[802]

While foreigners wrote these published articles, the fact that *Meteorological Science and Technology* translated these articles demonstrates that there was at least some degree of ecological rationality amongst China's scientists during the 1970s (at least after the 1972 United Nations conference in Stockholm) concerning the role that carbon dioxide performed in altering the climate.

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[798] Economy 1997, 23.
[799] Chinese name was transliterated as L. 马赫塔.
[800] Machta 1974, 42.
[801] Chinese name was transliterated as P. 海瑞克.
[802] Harycak 1980, 2.

By the late 1970s, Chinese academics and researchers were also discussing 'climate change' (气候变化). Writing in a 1978 issue of *Environmental Protection,* Chinese Academy of Sciences researcher Tao Shiyan 陶诗言 stressed that 'climate change is an important issue' and he stated that 'human activities' (人民生活) and 'industrialisation' (工业化) were exacerbating the issue. Moreover, industrial emissions from China's factories not only caused 'air pollution' (大气污染) but also led to 'climate change'. In particular, Tao argued that since the 1950s carbon dioxide emissions had grown exponentially with 'over 50 per cent' of those emissions remaining in the atmosphere.[803] Tao stated that such growth presented problems for the climatic system as it operated within a narrow band:

> It is estimated that if the global average temperature decreases a few degrees Celsius, then the current snow-covered area in the Arctic and the Antarctic will expand to the whole earth; if the global average temperature warms a few degrees Celsius, the ice and snow in the Arctic and Antarctic regions will all melt simultaneously. Many flat areas on Earth, such as Beijing, Shanghai, London, and New York, will become submerged. There are many reasons for the climate becoming colder and warmer, but the impact of air pollution is an important reason. Because of the continuous development of industrialisation on the Earth, the accumulation of pollutants in the atmosphere will change the atmospheric composition. Changes in an atmospheric composition can cause changes in atmospheric radiation balance, which can cause changes in the climate on Earth. Among the various atmospheric pollutants that may cause climate change, the most noticeable is the role of carbon dioxide.[804]

Even though foreign researchers wrote most of the research in the 1970s concerning climate published in China, Tao's article illustrates that there was a growing realisation among China's scientific researchers concerning excessive carbon dioxide emissions and the influential role that industrialisation was having on the climate.

Another Chinese researcher, Gu Yu 谷雨 from the Shaanxi Meteorological Research Institute also stated in a 1979 article that beyond solar activity, volcanoes, and atmospheric and oceanic circulation, the other leading cause of 'climate change' was the 'impact of human activities'.[805] Although 'the research in this area [of climate change science] was preliminary', he forecast increases in carbon dioxide emissions by 2050 that could present potential problems for high-yield agricultural areas, raising the average temperature by between '0.5 and 2 degrees'.[806] Both Tao Shiyan and Gu Yu's comments demonstrate an awareness within China's

[803] Tao Shiyan 1978, 6-7.
[804] Ibid, 6.
[805] Gu Yu 1979, 12.
[806] Ibid, 14.

scientific community of the destabilising impacts that China's industrialisation could have on the climate at the dawn of China's economic reforms.

After the publication of these articles, officials from central government bureaux would enter the policy discussion surrounding climate change. During the 1980s, researchers from the China Meteorological Administration (CMA)[807] published articles outlining the potential risks from global warming. For example, Huang Chaoying 黄朝迎 from the CMA's Beijing Meteorological Centre published an article in the *Journal of Catastrophology*, highlighting the negative socio-economic impacts that could result from global temperature rises:

> Since the 1960s and with the rise of temperatures in the Arctic, many climate anomalies across the world have become more frequent. Climate extremes in many parts of the world are now associated with rising food prices, trade disruptions, reduced stocks and famine…at present, the temperature in the northern hemisphere seems to be in a rising stage. The first five years of the 1980s were the warmest five-years since [the start of the] meteorological record. The broad temperature range in China is also slowly rising.[808]

Despite describing these catastrophic implications, he also raised some positive socio-economic impacts. For instance, he predicted that temperature rises in China could become an economic boon for forestry and agriculture industries with some tree species and crops able to grow in more northern climates. However, he also raised the possibility that climate change could reduce precipitation levels in China's northern regions, 'increasing water shortages' in those places.[809]

Qu Geping would once more become a prominent commentator within the policy discussion of climate change.[810] During the same period that he wrote articles on the negative effects of township-village enterprise (TVE) development and broader industrial development, he also touched on global warming and excessive fossil-fuel consumption. In one essay on global environmental problems, he discussed the 'greenhouse effect' (温室效益), noting that 'along with the expansion of energy and industrial production, atmospheric emissions of carbon dioxide have become more and more excessive'.[811] He had also claimed in an article a year earlier that the global levels of carbon dioxide in 'ppm' [parts per million] had risen since the 1850s and that the increase in carbon and the reduction of large swathes of forest that had

[807] Chinese name is 中国气象局. Other name was 国家气象局 (National Meteorological Administration).
[808] Huang Chaoying 1986, 112.
[809] Ibid, 113.
[810] See Chapter Five, Chapter Six and Chapter Seven.
[811] Qu Geping 1981d, 12.

previously acted as ‘large reservoirs for storing carbon dioxide’ had now ‘become a widely discussed international issue’.[812]

Qu advanced his discussion on global warming in another article published a year later in *Environmental Protection*. This article formed part of a more extensive four-part series focused on what he considered were the most critical environmental issues facing the global community.[813] The fourth article of his series focused on ‘the influence of human activities on the atmosphere’. Writing in the early stages of Deng’s ‘reform and opening up’, Qu Geping remarked that ‘in conjunction with energy development and industrial production, the quantity of carbon dioxide emissions entering the atmosphere has become increasingly large’. He forecast that rising carbon dioxide emissions would result in worrying consequences. For instance, ‘with the increase of carbon dioxide it will probably create a ‘“greenhouse effect” …this [greenhouse effect] could cause the South Pole’s south-eastern ice sheet to slide into the ocean potentially causing global sea-levels to rise 200 feet, submerging dry land under the sea’. To reinforce the ‘urgency’ (迫切) of responding to climate change, Qu also warned that ‘he who gives no thought to the problems of the future is sure to be beset by worries much closer to hand’ (人无远虑必有近忧). He argued that China should develop an environmental policy targeting climate change and should not put this off into the future.[814] Another related Qu article published in 1982 predicted that ‘if carbon dioxide concentrations double, then the temperature will rise by an average of 2 to 3 degrees, which will greatly affect agricultural production and lead to the melting of polar ice caps, inundating many cities and regions along the coast and bringing unprecedented disaster to humanity’. Linking to population concerns raised in Chapter Six, Qu stressed that ‘the rapid increase of population’ would have ‘a wide-ranging impact on the climate’ because of increased ‘human activities’.[815] Qu Geping’s early comments demonstrate that, beyond the confines of industrial pollution and waste, he adopted a holistic approach to China’s future that included a broader climatic perspective.

[812] Qu Geping 1980a, 4.
[813] Many of the broader ecological ideas he discussed in the article were mentioned in Chapter Five.
[814] Qu Geping 1981d, 12.
[815] Qu Geping 1982, 47.

As noted in Chapter Five and Chapter Six, Qu ranged across other non-climate change related environmental issues during the 1980s, but in 1987 he wrote an article on 'Human Survival in the Biosphere' which refocused attention on climate change risks. He noted that 'one of the serious consequences of climate warming is rising sea levels'. Referring to unnamed 'experts' (专家), he declared that if '[the global] temperature rises by two degrees, it will be sufficient to melt the gigantic glaciers in the Western Antarctic, which will increase the sea level by five metres, drowning many coastal and riverside cities and farmland'.[816] He also explained the flow-on effects of a changing climate, remarking that it would 'change global wind directions, rainfall, and the way the ocean circulates, all of which will harm the production of agriculture, forestry, animal husbandry and fisheries'.[817] He was confident enough in his predictions to declare that 'humanity will suffer enormous disasters' from climate change, even if he accepted that there were 'differences of opinion on the consequences of increased carbon dioxide levels'.[818] Even if other similarly-ranked government officials did not share this level of concern, Qu Geping's ideas at this time concerning global warming and carbon dioxide demonstrated a highly-developed ecological rationality towards the threat of a warming climate.

Qu Geping also drew attention to climate change within key Party and government publications in the late 1980s. In the CCP publication *Party Construction*, Qu wrote in 1989 that 'carbon dioxide provoking rising global surface temperatures' was one of 'the many new emerging environmental issues' that China and the international community faced.[819] In a 1990 edition of Xinhua's *Outlook* he reiterated that 'increased global warming had become extremely obvious', noting that over the past 100 years the six 'warmest' (暖和) were in the 1980s.[820] Moreover, leading up to the Rio conference of 1992, SEPA researchers were increasingly focusing on climate change and its potential effects on socio-economic systems under his leadership.[821]

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[816] Qu Geping 1987b, 3.
[817] Ibid, 4.
[818] Ibid, 3-4.
[819] Qu Geping 1989b, 28.
[820] Qu Geping 1990, 41.
[821] Jin Jianming 1990; Xia Guang 1991.

Qu Geping's articles throughout the 1980s reinforce his ecological awareness of the impact of human activities. He understood that rising carbon dioxide emissions and the 'greenhouse effect' would destabilise ecosystems, significantly impacting the functioning of modern societies. Although Chinese researchers were increasingly exploring global warming and reporting on international climate change conferences, senior officials within the environmental sections of China's bureaucracy, with the exception of Qu Geping, refrained from contributing to the broader public discussion of this issue.[822] They avoided voicing the same concerns towards climate change that they directed towards industrial pollution at this time.

However, by the turn of the decade, senior officials in the CMA and State Science and Technology Commission (SSTC) began mentioning 'climate change' or 'global warming' in their speeches, but in a more subdued and conservative manner than Qu Geping, eschewing the opportunity to emphasise some of the negative impacts from climate change, both regionally and globally.[823] For example, the first time that former National Environmental Protection Commission Chairman and PRC Premier Li Peng 李鹏 raised 'climate change' involved a few brief mentions at the 1991 Ministerial Conference on Environment and Development in Developing Countries in Beijing and the 1992 Rio Conference.[824] With respect to the environment, during this period Li kept his focus more centred on general environmental problems such as industrial pollution and population growth.[825]

The question that arises from the above discussion is why Qu Geping was the only government official at this time to draw policy attention towards the threat of climate change. The career of Qu Geping suggests that he was fortunate to be exposed to much of the leading scientific research concerning climate change. He was, as previously discussed in Chapter Five, China's first representative to the UNEP from 1976 to 1979. While serving in this three-year position, he would have been exposed to some of the emerging research in the 1970s that drew attention to the threats of a warming planet.[826] Chinese scholar Elizabeth Economy's

[822] Ibid.
[823] Luo Jibin 1990; Song Jian 1991; Zhang Jijia and Zhou Shuguang 1990.
[824] Li Peng 1992.
[825] See Chapter Five and Chapter Six.
[826] Bodansky 1993, 458-460.

investigation into the development of climate change policy in China has also emphasised the positive role that 'epistemic communities' have played in the development of scientific knowledge in China.[827] It appears from his writings that Qu would have maintained contact with individuals in the international environmental policy community after his United Nations posting which would have kept him informed of newly emerging climate change research. This would almost certainly have contributed to Qu Geping's awareness of the importance of rising carbon dioxide emissions. (However, one can only speculate on these contacts as Qu often shunned citations in his policy discourse). Climate change represented just one ecological concern that shaped Qu Geping's ecological rationality, with other elements including pollution, waste, and population growth.

Despite the lack of high-level commentary concerning climate change before the 1990s, the Chinese leadership had made a series of behind-the-scenes institutional moves by the early 1990s that suggested that they took the potential risks of climate change very seriously. These moves, coupled with the 1992 Rio Conference, would place climate change on the government's policy agenda. In 1987, the State Council had created the National Climate Committee[828], situating its secretariat within the CMA. Then, in 1990, the State Council formed the National Climate Change Coordination Group [829], modelling its structure on the organisation of the Intergovernmental Panel on Climate Change with interagency links between the SSTC and the SEPA. During this period, there were a series of internal reports circulated within these agencies that drew attention to the threat of climate change.[830] The internal nature of these reports indicates, as others have noted, that climate change was a politically-sensitive topic, and that kept broader discussion by senior policy officials muted.[831] The discussion of climate change was politically sensitive because a meaningful response would have ramifications for China's rapid economic development that was just over a decade old. Qu Geping's political linkages to former Premier Zhou Enlai could have provided him with a degree of latitude to discuss the subject. Interviews conducted by Elizabeth Economy

[827] Economy 1997, 38.
[828] Chinese name is 国家气候委员会.
[829] Chinese name is 国家气候变化协调小组.
[830] Economy 1997, 23-27; Hatch 2004, 48.
[831] Ibid.

reveal that former environmental policymakers under his charge 'questioned his attention to the issue given the vast problems involved in China's domestic environmental situation', suggesting that Qu Geping was passionate about drawing attention to climate change regardless of the attention it drew to him.[832] This context explains why Qu Geping remained an outlier in the Chinese climate policy discussions up until the early 1990s.

Along with organisational changes, policy discussion on climate change opened up during the early 1990s. The first marker of that adjustment was the State Council-convened National Symposium on Climate Change and Environmental Issues held in Beijing during January 1991. The symposium was important because it gave the first indication of the scientific and policy consensus on climate change (i.e. its causes and likely impacts). The summary of the symposium, published in *Environmental Protection,* stated that the consensus surrounding global warming was that the planet had recently experienced remarkably warmer weather: '1990 was the warmest year globally in forty-one years, and the 1980s was the warmest decade [this century]'. However, concerning 'the role of the greenhouse effect' in contributing to that 'global warming' (全球变暖), the conference participants were more uncertain about the science:

> According to the research of Chinese scientists, the world, the northern hemisphere and China have experienced significant warming since the beginning of the 20th century. However, the time and spatial distribution of this warming are not entirely consistent with the increase in greenhouse gases. The value of the greenhouse effect is difficult to explain for China's climate change. We cannot wholly negate the role of the greenhouse effect, but we cannot deny that natural factors are still the dominant factor in climate change. The cause of global warming, whether it is the result of the greenhouse effect, the fluctuation of the climate itself, or the combination of the two, still has scientific uncertainty.[833]

Although the statement from this symposium referred to the 'scientific uncertainty' (科学上的不确定性) of climate science and the inconsistencies of temperature data, it also declared that the ecological concern towards global warming had reached a point where humans had potentially become the most significant variable in climate change. Yet the statement surrounding the uncertainty of the science showed that the ecological rationality of human-caused climate change had to progress further for China's policymakers to propose with confidence ecological modernisation policies.

The ongoing prevalence of economic rationality was further demonstrated six months later, in June 1991, when the Chinese government organised a meeting in Beijing of foreign ministers

[832] Ibid, 28.
[833] Zhang Yuyan 1991, 248.

from forty-one developing nations to discuss issues of environment and development for developing countries (referred to as the 'Ministerial Conference on Environment and Development in Developing Countries'). The joint conference statement – commonly called the 'Beijing Declaration' (北京宣言) – outlined 'shared' principles for their development in preparation for the international environmental negotiations at the Earth Summit in Rio de Janeiro. Regarding the pressing international concern surrounding rising greenhouse gas emissions, the statement declared:

> We are gravely concerned about growing greenhouse gases that cause climate change and their potential impact on the global ecosystem, especially the developing countries with islands and lowlands. Responsibility for greenhouse gas emissions should be determined historically, cumulatively and in real terms. The solution should be based on the principle of equity, and the developed countries that cause more pollution should contribute more. Therefore, developed countries should shoulder their obligations to take measures to stop human-made climate change and establish mechanisms to guarantee the environmental safety and development in developing countries, including through the transfer of technology to developing countries for favourable or non-commercial conditions.[834]

The phrase 'gravely concerned about growing greenhouse gases' illustrates, on the one hand, an ecological rationality surrounding global warming. Yet, on the other hand, the statement remained couched in the economic rationality and economic opportunism of developing nations. Foreign ministers of those nations believed that the economic interests of their countries should not be unduly harmed because of the cumulative effect of prior carbon emissions produced by developed nations as they undertook their historical development. This mutual concern would result in China leading the bloc of developing nations in successfully advocating for the inclusion of the 'common but differentiated responsibilities' (共同但有区别的责任) principle within the 1992 United Nations Framework Convention on Climate Change. This principle stipulated that although all nation-states share an obligation to address the problems surrounding global warming, not all states share equal responsibility for the causes of that global warming.[835] This principle would soon become a frequent watchword in Chinese climate change policy discourse, reflecting the ongoing importance of economic concerns

[834] "Beijing Ministerial Declaration…" 1992.
[835] United Nations. 1992. "United Nations Framework Convention on Climate Change," 9 May, https://unfccc.int/resource/docs/convkp/conveng.pdf. Accessed May 18 2018.

within any discussion of climate change policy.[836] It represented an entanglement of ecological rationality within the dominant discourse of economic rationality.

The paramount importance of economic concerns over climate change in China was further revealed through Premier Li Peng's speech to the United Nations summit in Rio de Janeiro:

> While present attention is paid to such global environmental issues as climate change and biodiversity, it is particularly necessary to at the same time give proper consideration to the problems of ecological destruction faced by developing nations such as environmental pollution, soil erosion, desertification, vegetation loss, floods and droughts…resolving these issues would not only eliminate severe threats to the environment and the development of developing countries but also promote the global environment and global development.[837]

As Li Peng's comments demonstrate, the only environmental issues within the senior leadership's purview were 'environmental pollution, soil erosion, desertification, vegetation loss, floods and droughts'. However, taken together, the Beijing Declaration and Li Peng's speech are crucial to the development of ecological modernisation thought in China for two reasons. First, they indicate that ecological rationality within China's top political institution still ranked below economic development objectives. China's economic reforms were just under a decade and a half old, and while it had achieved impressive rates of economic development through rapid industrialisation over this period, there were still many areas of poverty within China that the authorities wished to tackle through providing industrial-based employment.[838] Second, although the concern surrounding climate change had grown significantly over the previous decade, it still ranked below other environmental issues, such as industrial pollution, and this focus would eventually lead to a prioritisation of cleaner production and the circular economy, as discussed in Chapter Five and Chapter Six.

The Ecological Rationality of China's Post-Rio Climate Change Discourse

Throughout the 1990s, China participated in a series of international climate change conferences as a result of its ratification of the 1992 United Nations Framework Convention on Climate Change.[839] These conferences culminated in the 1997 Kyoto Climate Conference in Japan where they signed the Kyoto Protocol, committing China to take action on climate change even if they did not allow themselves to be bound by specific reduction targets.[840]

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[836] Bao Shishao and Li Zhiming. 1992. "Yixie fada guojia daibiao zai huan fa dahui shang biaoshi chengdan teshu zeren baohu shijie huanjing" (Representatives of some developed countries expressed their commitment at the UNECD to protect the world environment), *Renmin ribao*, 10 June.
[837] Li Peng 1992, 5.
[838] Ibid.
[839] Economy 1997; Hatch 2004.
[840] Hatch 2004, 53-54; Heggelund, 2007.

However, the policy discussion concerning climate change remained primarily within the same environmental bureaucratic organ that had up to that point discussed cleaner production, namely the State Environmental Protection Bureau (SEPB). Xie Zhenhua, who was the director of the SEPB, became the most prominent senior official, apart from Qu Geping, to actively draw public attention to climate change in China.

Although the 1991 State Council conference had earlier maintained that there was 'uncertainty' concerning climate science, by 1995 Xie Zhenhua was more adamant that 'greenhouse gas emissions mainly caused global climate change'. Moreover, those 'greenhouse gas emissions were principally the result of the large discharge of carbon dioxide from the burning of fossil fuels by humans in production and life'. He noted that, based on current and forecast carbon dioxide emissions, the average temperature was set to rise by between 1.5 to 4.5 degrees, leading to 'sea level rises' and 'intensified storm surges' along China's coast. Concerning its socio-economic effects, he predicted that 'climate change would also have a broad, long-term and profound impact on agriculture, forestry, water resources and the ecological environment'.[841] These remarks were close to the ecological rationality espoused by Qu Geping, drawing attention to the broader socio-economic effects that a changing climate would have on China.

Despite the emergence of this climate change policy discourse in the 1990s, it took until 2002 for concern surrounding climate change to become a household issue. The catalyst for this growing awareness was the Chinese government's position at the September 2002 World Summit on Sustainable Development in Johannesburg, South Africa. There, Premier Zhu Rongji 朱镕基 announced that China would ratify the Kyoto Protocol – a decision that received scant commentary amongst China's media at the time. For instance, the *People's Daily* news dispatch from the event reported the announcement without quotations from the Chinese Premier.[842] However, despite this muted commentary, the event marked a crucial moment for China's ecological rationality towards climate change. The speech by Premier Zhu chose to

[841] Xie Zhenhua 1995, 1.
[842] Luo Chunhua and Li Xinfeng. 2002. "Zhu Rongji zongli fang fei qude yuanman chenggong" (Premier Zhu Rongji's visit to Africa was a complete success), Renmin wang, 6 September, http://www.people.com.cn/GB/shizheng/16/20020908/817525.html. Accessed 16 March 2017.

only obliquely refer to global warming, discussing 'common but differentiated responsibilities', 'global environmental problems' and 'abnormal climatic changes'.[843] However, the ratification of the Kyoto treaty suggested that China's senior leadership was taking seriously the threats posed by climate change. Moreover, this treaty bound China to an international environmental climatic regime that would soon require it to take environmental reform initiatives to reduce its carbon emissions.

Zhu's soon-to-be successor, then-Vice Premier Wen Jiabao, wrote an op-ed in the *Farmer's Daily* in late March 2002 which revealed how he saw the economic and social risks surrounding climate change. Wen's discussion of climate change represented the first official discussion of the impacts caused by a warming planet:

> The weather and climate change heavily influence production and livelihoods. In recent years, global climate change has been abnormal, with rising temperatures, severe droughts, increased hurricanes, and heavy rains. Frequent weather and climate extremes have brought great harm to economic and social development.[844]

Although he couched his ecological rationality in general terms, Wen's comments reflect a clear advance over the views expressed by Li Peng at the United Nations Summit in Rio in 1992, which had focused on issues of development and environmental pollution, and which placed less importance on climate change.

The next important step in the evolution of ecological rationality in China towards climate change also occurred in 2002 when the Ministry of Science and Technology joined with the CMA and the Chinese Academy of Sciences to take the lead in China's first *National Assessment Report on Climate Change*.[845] Over 100 scientists from more than 20 leading government and academic institutions were involved in the drafting of the report. It covered climatic trends, present and future impacts from climate change, and evaluations of potential mitigating policies. After reviewing the temperature data for the past century, the first part of the report concluded:

> Atmospheric carbon dioxide concentration in China has continuously increased and the sum of positive radiative forcing [or climate forcing] produced by greenhouse gases is probably responsible for the

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[843] Zhu, Rongji. 2002. "Speech by H.E. Zhu Rongji, Premier of the State Council of The People's Republic of China," Foreign Ministry of the People's Republic of China, 23 September, https://www.fmprc.gov.cn/mfa_eng/topics_665678/3747_666046/t19190.shtml. Accessed 16 March 2017.
[844] Wen Jiabao 2002.
[845] Ding Yihui et al. 2006; Lin Erda et al. 2007; He Jiankun et al. 2006.

> country-wide climate warming for the past 100 years, especially for the past 50 years. The projections of climate change for the 21st century using global and regional climate models indicate that, in the future 20-100 years, the surface temperature will continue to increase, and the annual precipitation also has an increasing trend for most parts of the country.[846]

The second part of the report noted that sea-levels along China's coast were rising, its marine ice was decreasing, its glaciers were retreating, and its permafrost was melting. There were also concerns that climate change could 'compromise long-term food security in China'. Crop productivity was predicted to 'decrease by 5 to 10 per cent' by 2030 if no action was taken on climate change. Furthermore, the report forecast that 'by the second half of the 21st century, climate change could cause a reduction in rice, maize and wheat yields by up to 37 per cent'.[847] Ironically, while climate change would increase 'the frequency of exceptional floods' in the South, it would also exacerbate present water insecurity in water-scarce regions such as the Northeast of China, with 'some simulations' indicating that 'water shortages' in the Northwest of China 'could reach about 20 billion m^3 per year' between 2010 and 2030.[848] The consensus among Chinese experts was that climate change would present existential problems for Chinese society.[849] This consensus ensured that the Chinese government would be forced to address the problem of balancing ecological and economic rationality in order to meet the challenge of climate change.

These reports were followed in 2007 by the State Council's first climate change white paper: *China's National Climate Change Programme.*[850] This white paper marked a significant step for Chinese authorities, representing the first mention of the threat of climate change within a high-level official document or law. For instance, the earlier 2005 *Renewable Energy Law* made no mention of climate change, even though many of the Law's measures would indirectly tackle climate change.[851] The climate change white paper reiterated many of the climatic changes that have affected China over the previous century, noting the sea-level rises and temperature changes. The document also declared that based on 'preliminary estimates',

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[846] Ding Yihui et al. 2006, 3.
[847] Lin Erda 2007, 6.
[848] Ibid, 7.
[849] He Jiankun et al. 2006, 147-148.
[850] Zhonghua renmin gongheguo guojia fazhan he gaige weiyuanhui. 2007. "Zhongguo yingdui qihou bianhua guojia fang'an" (China's national climate change programme), 4 June, http://www.ndrc.gov.cn/xwtt/200706/t20070604_139527.html. Accessed 23 August 2017.
[851] The purported rationale behind that law, however, remained the environmental issues explored in the previous chapters, such as clean production, the circular economy and green GDP, see 2005. "Zhonghua renmin gongheguo ke zaisheng nengyuan fa" (Renewable energy law of the People's Republic of China), Beida, http://www.pkulaw.cn/fulltext_form.aspx? Db=chl&Gid=832c894257ae2b43bdfb. Accessed 3 May 2018.

China's greenhouse gas emissions between 1994 and 2004 had grown by 4 per cent annually to be around 61 tonnes of carbon dioxide equivalent. However, the white paper also pointed out that carbon dioxide intensity (per unit of GDP) had decreased by nearly half from 1990 to 2004. This latter trend only emphasised the enormous task facing China.

Although *China's National Climate Change Programme* revealed that Chinese authorities were adopting an ecological rationality towards climate change, a robust economic rationality still prevailed in the language employed within the document. For instance, it stated that 'climate change…is an issue involving both environment and development, but it is ultimately an issue of development'; and warned that 'the possibility of the more frequent occurrence of extreme weather/climate events would increase in China, which will have immense impacts on the socio-economic development and people's living'. It also avoided any specific carbon dioxide emissions caps or targets. Instead, the aim was to reduce energy consumption per capita by 20 per cent from 2005 base levels by 2010, which, according to that policy document, would 'consequently reduce carbon dioxide emissions'.[852]

The significance of *China's National Climate Change Programme* for the ideational development of ecological modernisation in China lay in the fact that the State Council now identified climate change as an existential threat.[853] The discussion thus far in this chapter has shown that the discursive journey to understand the significance of climate change took around three decades. However, once China's leaders had crossed that political Rubicon, they would effectively have to create a strategy that responded to the ecological risks in a manner that avoided constraining their still developing economy. Like the considerations concerning cleaner production, circular economy and green GDP, the Chinese government resorted to adopting an ecological-modernisation concept that promised a win-win scenario for the economy and the climate: 'low-carbon economy' (低碳经济).[854] The following discussion will show how this concept of a low-carbon economy became the favoured approach to climate change among Chinese academics and then China's highest-level politicians.

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[852] Zhonghua renmin gongheguo guojia fazhan he gaige weiyuanhui. 2007. "Zhongguo yingdui qihou bianhua guojia fang'an" (China's national climate change programme), 4 June, http://www.ndrc.gov.cn/xwtt/200706/t20070604_139527.html. Accessed 23 August 2017.
[853] Ibid.
[854] While there is no one political slogan solely agreed upon to highlight these objectives, they all use the root-word 'low-carbon' (低碳), such as 'low-carbon development' (低碳发展) or 'green circular low-carbon development' (绿色循环低碳发展).

Climate Change and the Policy Discourse of a Low-Carbon Economy in China

Origins of a 'low-carbon economy'. The origins of the concept 'low-carbon economy' help explain its Chinese adaptation. Low-carbon economy, like other environmental reform ideas discussed so far in this thesis, originated outside China. Its conceptual origins primarily stem from the growing international discussions from the 1970s onwards concerning the ill-effects of climate change. It was also associated with the early debates over sustainable development which placed responses to environmental problems within the confines of economic development.[855] However, the specific promise of a 'low-carbon economy' gained popularity when the Labour government in the United Kingdom released its 2003 Energy White Paper, *Our Energy Future - creating a low-carbon economy.* The report was the UK Government's response to the growing threat of a changing climate. It was a political repositioning for the UK economy and how it would handle the then-upcoming EU emissions trading scheme, which was expected to commence operation in 2005.[856]

The UK report focused the challenge of climate change using an ecological modernisation narrative: although climate change would incur economic costs in traditional industrial sectors, overall it would present the UK economy with many economic opportunities that would improve the efficiency of the economy. For example, the report raised the economic advantages of shifting the UK economy towards a less-carbon intensive model:

> The opportunity to move the UK decisively towards becoming a low-carbon economy where higher resource productivity – producing more with fewer natural resources and less pollution – will contribute to higher living standards and a better quality of life. The opportunity to develop, apply and export leading-edge technologies, [thus] creating new businesses and jobs. Also, the chance to lead the way, in Europe and internationally, in developing environmentally sustainable, reliable and competitive energy markets that will support economic growth in every part of the world.[857]

The UK Government presented this low-carbon economy concept as a technocratic win-win policy solution. It is this mutually beneficial vision that reflects its ecological modernisation underpinnings. A low-carbon economy provided an optimistic view of regulated market-based mechanisms such as emissions trading schemes. These mechanisms provide environmental outcomes with climate change mitigation, but also improved economic results due to the reshaping of market behaviour towards new sustainable growth industries. A low-carbon

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[855] Ward and Dubos 1972, 267-268. See also Bodansky 1993, 2001.
[856] UK Department of Transport and UK Department for Food and Regional Affairs. 2003. "Our energy future – creating a low carbon economy," Gov.uk, 24 February, https://www.gov.uk/government/publications/our-energy-future-creating-a-low-carbon-economy. Accessed 7 June 2018, 13.
[857] Ibid, 6.

economy, like cleaner production, circular economy and green GDP, was an ecological modernisation concept consistent with the direction in which China's leaders were heading.

Zhuang Guiyang, the UK Government and the early discussion of a low-carbon economy. In China, the release of the UK Energy White Paper soon provided the conceptual grist for researchers' climate-change policy mill.[858] The UK Government, through its Foreign and Commonwealth Office's Global Opportunities Fund, subsequently helped finance the CASS's 'Promoting Low-Carbon Development with Incentives' project. The result was a conference funded by the UK Government in Beijing in 2005.[859] That conference provided the first significant policy discussion concerning a low-carbon economy in China. The lead researcher on that project was CASS researcher Zhuang Guiyang 庄贵阳. Zhuang argued at the conference that China needed to adopt a low-carbon developmental path because of both 'external drivers' (外部驱动) and 'internal requirements' (内部需求).[860] The *external drivers* were China's Kyoto Protocol obligations. Although Zhuang acknowledged that the Kyoto Protocol had yet to impart any significant economic costs onto China at its present stage of development, China would have to 'meet the post-Kyoto challenge' when the international community next revisited a new international climate change agreement. He believed that the 'international community' would make China commit itself 'to obligations to reduce greenhouse gas emissions' in a manner that was commensurate with its position as 'an important actor on the world stage'.[861] A low-carbon economy would provide that path for China and help meet its responsibilities and challenges in a manner that would avoid compromising its ongoing economic development. Along these lines, the call for low-carbon economy shared a similarity to arguments for a 'circular economy' and concerns over 'green barriers'.[862] Concepts rooted in ecological modernisation thought were again providing Chinese academics with the optimism to help navigate China's path towards 'sustainable development'.

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[858] Jin Zhiyong 2003.
[859] Zhuang Guiyang 2005a.
[860] Zhuang Guiyang 2005b, 79.
[861] Ibid, 80.
[862] See Chapter Six.

Equally important were the *internal requirements* Zhuang raised, namely China's carbon-intensive industries and their limitations. As noted throughout this thesis, China's economic development prior to 2005 had been energy and resource intensive as it undertook 'rapid urbanisation and infrastructure construction'.[863] Zhuang noted that 'energy supply and energy security have become the main factors constraining China's industrialisation'. Its 'rapid economic growth' had lent itself towards an economic structure heavily skewed towards carbon-intensive industries such as electricity, steel, and chemical industries.[864] This economic structure had significant implications for China's contribution to global greenhouse gas emissions. For instance, Zhuang revealed that 'from 1990 to 2001, China's net carbon dioxide emissions had increased by 823 million tonnes, accounting for 27 per cent of the world's total growth'. Coal was identified as the chief contributor to carbon emissions, and it was the main force behind the need for a low-carbon economy. Zhuang declared that from 2000 to 2004 standard coal consumption had risen from 1.35 billion to 1.97 billion tonnes. This sharp increase in coal led to 'shortages' (短缺). A heightened fear of an energy crisis still lingered in China in the aftermath of the coal shortages experienced across the country in the winter of 2003 and 2004, which had led to widespread blackouts (see Chapter Six).[865] His comments concerning both the internal and external requirements for a low-carbon economy reinforced the economic imperatives that lay behind Chinese concerns with transforming its economy. Moreover, the comments show that the drivers behind a low-carbon economy were consistent with the economic concerns that drove a circular economy, such as high resource usage.[866]

These economic concerns were also consistent with an ecological modernisation interpretation of a low-carbon economy. Zhuang interpreted all issues concerning climate change and fossil-fuel use as the potential for China to adopt a 'first-mover' advantage if it took the initiative of implementing low-carbon development. He drew inspiration from the way in which the UK Government framed climate change policy and how its adoption of a low-carbon economy 'was guided by government and commercial incentives', as well as how the UK Government's encouragement of 'the latest low-carbon technologies would provide a clear

[863] Zhuang Guiyang 2005b, 81.
[864] Ibid.
[865] Ibid, 83.
[866] See Chapter Six.

and stable policy framework for industry and investors that would promote the transformation of its entire economic structure'. With one eye focused on China's economic development, Zhuang was concerned that its recent investment was 'mostly a simple copy of conventional technology'.[867] This type of investment presented problems, particularly a '"lock-in effect" (锁定效应) of investment and capital' that would hinder China once it had to meet global greenhouse gas emissions.[868] In a later article, Zhuang contended that China's economy was too highly geared towards 'exports' with high 'embodied energy' (隐含能源), with close to 'fourteen per cent of its emissions' produced from creating goods for 'US consumers'. The lesson was that China needed to move beyond its current position as the 'world factory' (世界加工厂).[869] A low-carbon economy would provide that economic opportunity while enabling the country to meet its future global environmental obligations.

Furthermore, the same article strongly suggested that Zhuang supported many of the positive economic claims put forth in the Stern Review on the Economics of Climate Change, chaired by British economist Nicholas Stern.[870] Indeed, Zhuang cited Stern and used his claims to bolster calls for a low-carbon economy in China. Zhuang stressed the 'economic losses' (经济损失) that could occur if China neglected a transition to a low-carbon economic model. He argued that China could avoid costly economic write-offs in the future if it invested more in 'technological research and development'. In particular, he argued that 'low-carbon economy investment of one per cent of global GDP could avoid GDP losses of 5 to 20 per cent in the future'. China possessed the requisite funds for such a transition, he claimed, as it had a 'high savings rate', and these surplus funds needed to 'perform more efficiently' than currently.[871]

Zhuang's enthusiasm for a low-carbon economy represented the earliest Chinese statements on a 'low-carbon economy'. They were presented as a means to converge ecological and economic views, tackling the threat of climate change while restructuring the economy. For instance, he warned that even modest investment in high-carbon infrastructure in the short-term would result in high economic losses in the future. Zhuang's comments also highlighted the intellectual (as well as financial) contribution of the UK Government in charting the low-

[867] Zhuang Guiyang 2005b, 84.
[868] Ibid, 79.
[869] Zhuang Guiyang 2007, 52.
[870] Ibid.
[871] Ibid.

carbon economy path. The lead author of the UK Government's energy white paper Nicholas Stern collaborated with Chinese research institutions such as CASS through the Interdependencies on Energy and Climate Security for China and Europe Project, which aimed to 'facilitate further understanding of China–EU interdependence and the potential for collaboration on energy and climate security issues'.[872] Zhuang's policy discussion shows that Nicholas Stern's ideas found a receptive audience among Chinese researchers.

Low-carbon economy enters onto the political stage. Up until 2007, the concept of a low-carbon economy, at least publicly, remained isolated to CASS, and a few academic networks. That isolation ended when President Hu Jintao 胡锦涛 first mentioned the concept in his September 9 speech to the 2007 Asia Pacific Economic Cooperation (APEC) conference in Sydney, Australia. As the earlier discussion in this chapter indicates, the State Council had released China's first climate change policy only three months before this speech. Therefore, Hu's speech provided the first public opportunity for China to express its policy response to climate change to an international audience. That response was China transitioning to a low-carbon economic structure. In his speech to the other international leaders, President Hu noted:

> Climate change is fundamentally a development issue which can only be adequately resolved based on the premise of sustainable development. Sustainable development requires the coordination of economic growth, social development and environmental protection. Stopping development in response to climate change or unilaterally pursuing economic growth without regard to climate change is undesirable. It is necessary to establish production methods and consumption methods that meet the requirements of sustainable development, optimise the energy structure, promote industrial upgrading, *develop a low-carbon economy* [emphasis added], and strive to build a resource-saving and environment-friendly society to fundamentally address the challenges of climate change.[873]

Hu Jintao used the term 'low-carbon economy' a further three times in his speech.[874] With the scientific case already made for the reality of the greenhouse effect, Hu championed low-carbon development as the 'necessary developmental path to travel towards a new kind of industrialisation'.[875] He stated emphatically that a low-carbon economy was the only path out of China's present climate change predicament while maintaining its economic modernisation. This argument was couched in the language of ecological modernisation. This narrative was also consistent with a sustainable development outlook that included cleaner production and

[872] Chatham House. 2007. "Changing Climates: Interdependencies on Energy and Climate Security for China and Europe," November, https://www.chathamhouse.org/sites/default/files/public/Research/Energy, 20Environment%20and%20Development/1107climate.pdf. Accessed 31 May 2018.
[873] Hu Jintao. 2007. "Hu Jintao zai APEC di shiwu ci lingdao ren fei zhengshi huiyi shang de jianghua" (Hu Jintao's speech at the 15th APEC Leaders' Informal Meeting), Gov.cn, 8 September, http://www.gov.cn/ldhd/2007-09/08/content_742977.htm. Accessed 31 May 2018.
[874] As counted by a State Councillor and NDRC Energy Bureau Director, see Xu Dingming 2007, 36.
[875] Quoted in Wan Gang 2007, 11.

circular economy. Moving beyond the earlier Chinese rationale for pollution control, Hu argued that climate change mitigation was based on the 'premise of sustainable development'. The convergence of ecological and economic rationality was now central to China's climate change policy.

After Hu Jintao and the CCP had given their ideological endorsement to low-carbon economy, various ministerial and vice-ministerial level officials began openly advocating the concept. The Ministry of Science and Technology Minister Wan Gang 万钢 was one of the first government ministers to promote a low-carbon economy in a speech he presented one month after Hu Jintao returned from the APEC Conference in Sydney. Wan noted the vital role that 'technology' (技术) would have in implementing a low-carbon economy. Reflecting on the importance of this concept for his policy portfolio, Wan called for more 'technological investment' (技术投入) in low-carbon industries so China could 'grasp the historical opportunity from the new technological revolution to vigorously develop a low-carbon economy'.[876]

NDRC Energy Bureau Director Xu Dingming 徐锭明 followed up this argument in a speech he gave to the 2007 China Energy Sustainable Development Forum. Xu highlighted the levels of embodied pollution and carbon that produced the energy China traditionally relied upon:

> Perhaps people do not know that creating a kilowatt of electricity releases 7 grams of sulphur and 1 kilogram of carbon dioxide; producing 1 tonne of steel releases 1.68 tonnes of carbon dioxide; producing 1 tonne of aluminium produces 21.8 tonnes of carbon dioxide; the full combustion of 1 litre of petrol releases 2.2 kilograms of carbon dioxide. Moreover, 10 kilograms of straw (crops) can reasonably absorb 16 kilograms of carbon dioxide, and the increase of a cubic metre of forest trees can absorb 1.83 tonnes of carbon dioxide.[877]

Xu's comments reinforce the reflexive nature of Chinese economic development and its relationship with the ideas inherent in ecological modernisation. Xu specifically raised this process of reflexivity when he stated that 'in the process of human's energy development, humanity itself also has a historical development process that has taken it from unaware to aware, from unconscious to conscious and from passive to active'.[878] The same reflexive reading on China's modernisation that led to cleaner production, circular economy and green GDP was now also applied to a low-carbon economy.

[876] Wan Gang 2007, 13.
[877] Xu Dingming 2007, 36.
[878] Ibid.

The Ministry of Environmental Protection and a low-carbon economy. From 2009, MEP researchers began to highlight the merits of a 'low-carbon economy' and included the concept in their policy articles. Their entrance into the low-carbon economy discussion was not unusual, because even though the NDRC had been the lead agency responsible for climate change policy since 2003, the head of the MEP/SEPA was on the cabinet-level leading small group for climate change policy.[879] Although they lacked the ultimate bureaucratic clout in climate change policy, they could still influence policy discussions concerning a low-carbon economy. In a 2009 report, Peng Jinxin 彭近新 from the MEP's Science and Technology Commission critiqued China's coal-dependent energy system. While he recognised China needed to continue using coal to power its economic industrialisation, it was important to 'combine the development of a low-carbon economy with an adjustment of the energy structure to avoid repeating the high-carbon energy and high-carbon economics of developed countries'.[880]

Furthermore, Cao Fengzhong from the MEP's Environmental and Economy Policy Research Centre also highlighted the strengths of a low-carbon economy in the lead up to the 2009 Copenhagen Summit, maintaining his enthusiasm for ecological modernisation reform measures. In a 2009 article in *Urban and Rural Development*, Cao accepted that China faced unique difficulties in responding to climate change when compared with those faced by developed nations. Because China was a 'developing nation', it 'would seriously restrict the development of [its] energy industry and national economy'. If it 'reduced greenhouse gas emissions like developed countries', the long-term goal of China's economic and social development 'would be seriously challenged'.[881] However, although Cao understood those economic concerns, he also argued that climate change would present even bigger problems in the future if policy action was avoided. For example, China's 'carbon dioxide per capita emissions were likely to exceed the United States' to become the 'first in the world', and its 'energy consumption would account for around 60 per cent of the global total energy consumption'. China could no longer ignore 'international pressure to reduce its emissions' as

[879] Called the National Climate Change Response and Energy Conservation and Emissions Reduction Leading Small Group (国家应对气候变化及节能减排工作领导小组)
[880] Peng Jinxin 2009, 71.
[881] Cao Fengzhong 2009, 73.

those ‘voices were getting higher and higher’ in calling for China to ‘reduce its greenhouse gas emissions’. Like the ‘green tariff barrier’ fears that justified calls for a circular economy, Cao Fengzhong warned that China might face retaliatory action by the international community or developed nations through the erection of ‘climate barriers’ (气侯壁垒) if they neglected to reduce their carbon emissions. These potential barriers would cause ‘substantial damage to China’s economy’.[882] Echoing an ecological modernisation argument, Cao argued that ‘developing a low-carbon economy would help alleviate the pressures China faced to reduce greenhouse gas emissions and protect environmental capital’.[883]

Cao argued that it was an economic imperative for China to respond to climate change, and his analysis was consistent with ecological modernisation. A low-carbon economy presented China with the opportunity to pursue ‘green development’ (绿色发展) and would promote environmental protection measures that extended beyond merely greenhouse gas emissions and climate change. In another 2010 article in *Environment Economy*, Cao and his co-author expressed a technological optimism towards a low-carbon economy:

> Although China faces some difficulties in developing a low-carbon economy, at the same time, China has great potential for improving energy efficiency and energy conservation, optimising energy structure, adjusting industrial structures, increasing carbon sinks, enhancing technological innovation capabilities, and improving consumption methods. Taking the green economy development model from “high-carbon” (高碳) to “low-carbon” (低碳) is an opportunity to promote the development of a low-carbon economy through economic means by utilising market mechanisms to slow down damage towards the climate from human activities.[884]

Cao and his colleagues clearly adopted the optimism of ecological modernisation in their support for a low-carbon economy. They saw ‘technological innovation’ (技术创新) as the means to adjust China’s industrial structure along more ‘low-carbon’ lines. Moreover, ‘market mechanisms’ (市场机制) could provide the stick to ‘slow down damage towards the climate from human activities’.[885]

A question that arises from this discussion, however, is why SEPA entered into the policy discourse concerning ‘low-carbon economy’ at a later stage compared to discussions over cleaner production, circular economy and green GDP. With those earlier ecological

[882] Ibid.
[883] Ibid, 73-74.
[884] Cao Fengzhong and Tian Chunqiu 2010, 56.
[885] Ibid.

modernisation concepts, MEP researchers such as Cao Fengzhong positioned themselves at the vanguard of the policy debate.[886] They acted as 'environmental policy entrepreneurs' driving environmental policy reform.[887] With respect to a low-carbon economy, however, MEP researchers could not assume a similar vanguard role because while Party leaders had little qualms acknowledging that pollution and environmental degradation threatened China's environment and economic development, those same leaders were more reticent on, and conservative in, pronouncing their position on climate change policy, as the earlier discussion has highlighted. It would take until 2007 before the State Council stated its position on the science behind climate change and global warming with the release of *China's National Climate Change Programme*. Prior to this, the ecological rationality espoused by SEPA researchers towards climate change was too politically sensitive to challenge the prevailing economic rationality.

The specific bureaucratic responsibilities of the MEP could also explain its belated entrance into the low-carbon economy debate. Its environmental protection work directly applied to many of the environmental issues relevant for cleaner production, circular economy and green GDP, such as air, water and solid waste pollution. However, the State Council had taken responsibility for climate change from the CMA and had given it to the State Economic and Trade Commission and then the NDRC. Although it was on the National Responding to Climate Change and Energy Conservation and Reducing Emissions Leading Small Group, its responsibilities did not include formulating climate policy.[888] However, as the discussion below will further attest, the decision by the State Council to place climate policy in the hands of the economic sector of China's bureaucracy, like cleaner production, provides an organisational illustration of the convergence of ecological and economic rationality in China's environmental policy agenda.

Despite their secondary-status concerning climate change policy, the senior leadership within the MEP were quick to publicly embrace the idea of a low-carbon economy. For

[886] See Chapter Five, Chapter Six and Chapter Seven.
[887] Mintrom and Norman 2009.
[888] It was only after the State Council created the Ministry of Ecological Environment in 2018 that China's lead bureaucratic agency to 'take the lead' (牵头) in climate change work, see Zhonghua renmin gongheguo shengtai huanjing bu. 2018. "Yingdui qihou bianhua si (jiancheng qihou si)" (Climate Change Response Division (abbreviated as Climate Division)), 8 October, http://www.mee.gov.cn/xxgk2018/xxgk/zjjg/jgsz/201810/t20181008_644817.html. Accessed 21 January 2019.

example, the then-Vice-Minister Wu Xiaoqing 吴晓青 wrote an opinion piece in a 2010 issue of *China Petroleum Enterprise* that called for 'a transition to a low-carbon economy'. Wu, a Yunnan native and member of the China Democratic National Construction Association, had graduated in the 1970s with a physics major from Yunnan University before commencing his career in the Kunming Iron and Steel Company. From there he transferred into the science and technology sector of the Yunnan provincial government before taking up a post in the Yunnan Environmental Protection Bureau in 1998. In 2005, he transferred to Beijing where he assumed a vice-director position in the SEPA.[889] In his 2010 opinion piece, Wu argued that 'it is an indisputable fact that the rising concentration of carbon dioxide in the atmosphere has brought about global climate change' and that it had also 'become a consensus among countries around the world that improving energy efficiency and reducing carbon emissions were the responses to climate change'.[890] He stressed that even though reducing China's carbon emissions would be 'a long-term process' and that it would be difficult for China to 'get rid of its high degree of dependence on economic development that used high levels of resources and energy', it needed to 'transition towards a low-carbon economy'.[891]

Wu further noted that China would need to implement the right 'policy instruments' as well as appropriate legislation if it was to overcome its low level of technology, which he claimed represented a 'serious obstacle' (严重阻碍) to China's implementation of a low-carbon economy.[892] He also raised the 'lock-in effect' (or 'path dependency') concept that Zhuang Guiyang discussed in his earlier 2009 trailblazing articles:

> The term "lock-in effect" refers to basic facilities, machine equipment, and large-sized durable consumer goods. Their service life is usually between 15 to 50 years, and it is not easy to discard them, so technology and investment will be "locked in" (锁定). Take residential construction as an example, from [China's] existing buildings, around 95 per cent are high-energy buildings. If the situation does not improve in the future and a more significant number of high-energy houses were not built, it would be difficult to renovate in the short term. To ensure an economically optimal transition to a low-carbon future, today's investment decisions must avoid leading to the lock-in of high carbon emissions.[893]

Like Zhuang, Wu's comments supported a low-carbon economy, reflecting an ecological modernisation mindset in the sense that it merges economic and ecological rationality to tackle the threat of global warming. Wu believed that China's developmental model had achieved

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[889] Zhongguo minzhu jianguo hui. 2017. "Wu Xiaoqing tongzhi jianli" (Comrade Wu Xiaoqing's resume), 21 December, http://www.cndca.org.cn/mjzy/mjgk/ljmjzyld/1215741/1217358/index.html.
[890] Wu Xiaoqing 2010, 51.
[891] Ibid.
[892] Ibid.
[893] Ibid.

remarkable achievements, but past choices were locking China into a higher carbon future than if it had chosen to make more low-carbon economic decisions. He said that the opportunities that Chinese investors made now would have economic and ecological ramifications for close to half a century. This situation needed to be avoided if they were to transition to a 'low-carbon future'.

Li Ganjie, a future minister of the Ministry of Ecological Environment, also advocated a low-carbon economy in a 2011 book review of CASS's *Blue Book of Low-Carbon Economy* when he was a vice-minister of the MEP.[894] Li's comments on a low-carbon economy mirrored those of his colleague Wu Xiaoqing. For instance, Li emphasised the economic rationality behind the low-carbon economy. He said that transitioning to low-carbon development would provide China with a means to continue its industrial development by providing 'energy security' (能源安全).[895] He noted that China's rapid industrialisation was dependent on an energy structure that drew close to 70 per cent of its primary energy from coal, over 42 per cent more than the global average, and this required reliance on coal imports. Although China faced other pressing environmental problems apart from implementing a low-carbon economy (noting that 'a low-carbon economy is only one of the requirements for sustainable development'), Li believed that China should transition towards a low-carbon economy with the support of 'developed nations' that had already made significant achievements with low-carbon innovation.[896]

The support for a low-carbon economy among the MEP officials mirrored their support for cleaner production, circular economy and green GDP, in the sense that they stressed the positive aspects of market forces and technology. Although their concern towards rising greenhouse gases drove their support of a low-carbon economy, they responded with the same ecological-modernisation optimism that encouraged support for those other concepts, albeit at a later stage in the policy debate (after being given the 'green light' from the Party hierarchy). The threat of climate change necessitated a similar use of market mechanisms and technological innovation. As the next section demonstrates, the NDRC also provided backing for the concept, especially concerning the role that 'market mechanisms' would play in the

[894] Li Ganjie was mentioned in Chapter Four regarding dual Party and government appointments.
[895] Li Ganjie 2011, 116.
[896] Ibid.

transition to a low-carbon economy. This bureaucratic alignment between environmental and economic government agencies was necessary for its promotion.

The National Development Reform Commission and a low-carbon economy. From 2008, senior officials from the economic-orientated NDRC also had started to adopt the concept of a low-carbon economy publicly. The role of Xie Zhenhua was raised in Chapters Five, Six and Seven on cleaner production, circular economy and green GDP, where he called for ecological modernisation responses to China's environmental challenges. Those views were expressed when he was the head of the SEPA (before he resigned in the aftermath of the Song Hua River chemical factory explosion in 2005). In his new position as China's lead climate change negotiator, he began raising the issue of low-carbon economy in policy speeches in the lead up to the 2009 United Nations Climate Change Conference in Copenhagen. Like Zhuang Guiyang, Wu Xiaoqing and Li Ganjie, he believed that technology was a crucial aspect of transitioning to a low-carbon future, but he stressed that China needed the assistance of developed nations to help with that transition:

> The development and breakthrough of new technologies are indispensable for the final resolution of climate change issues. Similarly, the transfer and application of prior technology is a necessary condition for developing countries to move to a path of low-carbon economic development. According to the provisions of the Convention and the Protocol, developed countries have the responsibility and obligation to transfer technology to developing countries on preferential terms.[897]

Moreover, in a 2009 article in *Macroeconomic Management*, he noted that 'low-carbon economy would provide a useful reference…to cope with climate change'.[898] A year later he reiterated in *Shanxi Energy and Conservation* that: 'I am convinced that more and more people have realised that we must transform traditional development methods and consumption patterns to a path of low-carbon economic development, and ultimately realise the harmonious development between man and nature'.[899]

Xie Zhenhua adopted innovative compound terms employing the concept 'green low-carbon development' (绿色低碳发展), 'green circular low-carbon development' (绿色循环低碳发展), and 'green development' (绿色发展), which combined the ecological modernisation concepts officials had been using since the 1990s:

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[897] Xie Zhenhua 2008, 9.
[898] Xie Zhenhua 2009, 5.
[899] Xie Zhenhua 2010a, 14.

> Green development is a combination of a circular economy and low-carbon development; this new development approach and way of life is an effective way to resolve the end of resources and energy in China and improve the quality of economic growth. It is an inevitable choice for achieving economic development, saving resources, protecting the environment and coping with climate change. In a broad sense, green development covers conservation, low-carbon, recycling, eco-environmental protection, harmony between man and nature, etc. In a narrow sense, green generally means the connotation of eco-environmental protection'.[900]

In contrast to Li Ganjie, Xie did not discuss a low-carbon economy in isolation. He believed that future environmental policy should interlink cleaner production, circular economy and low-carbon economy to avoid 'unbalanced, uncoordinated and unsustainable development'. He said that pollution was having 'serious adverse effects on the improvements in people's quality of life' while the 'pressures of climate change were growing'.[901] He also stated that the Chinese economy needed to rely less on fossil fuels and more on new energy sources such as wind power and solar power, and that this transition would result in decarbonisation as well as pollution abatement.[902] Xie Zhenhua's response to climate change required the same balancing of economic and ecological rationality as that needed for pollution and environmental degradation.[903]

Like CASS's Zhuang Guiyang and the MEP's Wu Xiaoqing, Xie wanted China to avoid the 'lock-in effect' whereby its future energy demand and greenhouse gas emissions would contain a large 'carbon content' (碳容量). Its rapid industrialisation and urbanisation had adopted a traditional technological route. This traditional route would present problems in the future:

> Taking the road of low-carbon development is the essential requirement of China's sustainable development. Although China's economy has achieved rapid development, in recent years, there has been no fundamental change in the extent of development. The energy consumption per unit of GDP is still much higher than that of developed countries, resulting in a tight supply and demand for energy resources. As a country with a low per capita resource share, if we rely on large developmental methods to promote modernisation, not only will China's domestic resource environment become challenging to support, but the global resource environment will begin facing pressure. Transforming the economic development model is imperative.[904]

Xie's comments concerning a low-carbon economy were also part of a reflexive interpretation of China's economic development. Like previous ecological modernisation concepts discussed in this thesis, Xie's discussion of low-carbon development drew on a narrative that foresaw

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[900] Xie Zhenhua 2012, 12.
[901] Xie Zhenhua 2013, 10.
[902] Ibid, 11.
[903] See Chapter Five, Chapter Six and Chapter Seven.
[904] Xie Zhenhua 2011a, 4.

China's transition from 'traditional development' to 'sustainable development'. He also appears to have understood, like Li Ganjie, that China's low per capita levels of natural resources would generate future problems if China did not deviate from its historical unsustainable development path. It needed to avoid the historical weight of the lock-in effect.[905]

Yet, there was an economic rationality inherent in Xie's support for low-carbon development. This was demonstrated through his emphasis on the economic opportunities that a low-carbon economy could achieve. Like others, he specifically drew inspiration from the UK's 'low-carbon development system'.[906] Xie observed that through the use of 'government policies and market mechanisms, based on the participation of enterprises and the public, the foundation had been laid for the UK to improve its core competitiveness in the future and achieve low-carbon development'. Xie claimed that if China was to avoid a high-carbon future, its government needed to facilitate low-carbon industries.[907] Xie retained this view in later years, advocating the economic benefits of low-carbon development, arguing that its appeal went beyond decarbonisation. For instance, in a 2017 article, Xie observed that while China's 'green low-carbon industry' employed around 24 million people, it was predicted to rise to around 45 million people by 2030.[908] For China to expand this industry, it needed to 'seize its opportunities' in order to best place itself vis-à-vis other countries to 'seize the commanding heights of future technology and industrial development'.[909] In his view, China's future economic growth was dependent on improving its comparative advantage in green low-carbon industries.

The economic rationality inherent in low-carbon development was also expressed in Xie's support for a 'carbon market' (碳市场). In a 2011 article in *China Venture Capital* concerning potential climate change policy responses, he introduced a proposal for 'carbon emissions trading pilots' in addition to 'gradually building a carbon emissions trading market' as one of 'ten strategies to promote green low-carbon development'.[910] A year later, he argued that 'the

[905] Ibid.
[906] Xie Zhenhua 2010b, 12.
[907] Ibid, 14.
[908] Xie Zhenhua 2017, 9-10.
[909] Ibid, 8.
[910] Xie Zhenhua 2011b, 4-5.

creation of a carbon trading market would have a profound impact on the fundamental function of market mechanisms for energy conservation, efficiency reduction and carbon reduction, and the improvement of long-term mechanisms for energy conservation, efficiency reduction and carbon reduction'.[911] Indeed, in order to achieve a low-carbon economy, the State Council in the 12th Five Year Plan (2011-2015) set out a pilot program for carbon markets in Beijing, Shanghai, Tianjin, Chongqing, Guangdong, Hubei and Shenzhen that would eventually be unified and expanded into a national market (this occurred in 2012).[912] Xie's public commentary around this period again conveys the appeal among leading Chinese bureaucrats for the ecological modernisation belief in the role of 'market mechanisms' (市场化机制) in their effort to balance ecological and economic considerations.[913] For instance, he claimed that a carbon trading scheme would produce 'synergies' (协同效应), enhancing the integration of 'different policies such as fiscal and taxation policies, legal means and market mechanisms, and form carbon reduction and energy conservation, and develop renewable energy'.[914]

A low-carbon economy and development represent a further progression of China's policymakers' support of ecological modernisation ideas, moving beyond cleaner production and circular economy, through linking it to climate change. Practical examples of this progress were evident as early as 2010 when the NDRC initiated pilot-projects for 'low-carbon cities' (低碳城市) (or low-carbon eco-cities 低碳生态城市), a year before the emergence of regional carbon markets. The pilot program sought to help 'adjust industrial structures, optimising energy structures, energy efficiency and increasing carbon sinks' in eight provinces and municipalities. It focussed on 'the development of low-carbon buildings and low-carbon transportation'. A low-carbon economy also mirrored the concept of a circular economy and green GDP through the NDRC's call to 'actively advocate low-carbon green lifestyles and consumption patterns'.[915] The NDRC emphasised that low-carbon development should focus

[911] Xie Zhenhua 2012, 13.
[912] Guowu yuan. 2012. "Guanyu yinfa jieneng jian pai "shi'erwu" guihua de tongzhi" (Notice on printing and distributing the 12th Five-Year Plan for energy conservation and emission reduction), Gov.cn, 6 August, http://www.gov.cn/zwgk/2012-08/21/content_2207867.htm. Accessed 29 May 2018.
[913] Xie Zhenhua 2005b; Xie Zhenhua 2013, 13.
[914] Xie Zhenhua 2013, 15.
[915] Guojia fazhan gaige wei. 2010. "Guanyu kaizhan di tan sheng qu he di tan chengshi shidian gongzuo de tongzhi" (Notice on the development of low-carbon provinces and low-carbon city pilot work), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid=4d20248912dd74b2bdfb. Accessed 29 May 2018.

on both the supply side and the demand side of the low-carbon economy, a point that was integral to the circular economy. It also needed to change the mindset, or culture, of not just society but also cadres:

> In the pilot areas, training activities should be held for leading cadres at all levels and departments to improve the emphasis and understanding of climate change issues in decision-making and implementation. Vigorously carry out publicity and education popularisation activities, encourage low-carbon lifestyles and behaviours, promote the use of low-carbon products, promote the concept of low-carbon life, and promote broad participation and conscious action by all.[916]

Like Pan Yue, Xie believed that China's response to climate policy needed to provoke government officials at all levels to assume a style of governance that prioritised climatic ecological rationality.[917]

The current policy status of a low-carbon economy in China. The concept of a low-carbon economy has remained an essential policy concept during the Xi Jinping administration ever since 2012. Soon after Xi Jinping took the leadership of the CCP from Hu Jintao, he started to employ the term in his Party speeches. For example, at the Sixth Study Session of the Chinese Politburo Standing Committee in 2013, as Chinese President and CCP General Secretary, Xi Jinping highlighted the extent to which he believed that low-carbon development, environmental protection and future economic growth were intertwined when he announced:

> Protection of the ecological environment is the protection of productivity. The improvement of the ecological environment is a concept of developmental productivity. There should be a more conscious promotion of green development, circular development, low-carbon development. There should never be the sacrificing of the environment at the expense of obtaining economic growth'.[918]

Moreover, since 2010, the National People's Congress (NPC) has deliberated the possibility of a '*Low-Carbon Economy Promotion Law'* (低碳经济促进法). The NPC's Financial and Economic Committee[919] raised the possibility of a low-carbon economy law in their 2010 committee report:

> A low-carbon economy refers to an economic model based on low energy consumption, low pollution, and low emissions. It is another significant step forward in the continuation of human society following agricultural civilisation and industrial civilisation. The essence of a low-carbon economy is the efficient use of energy, the development of clean energy and the pursuit of green GDP. The core is the fundamental change in energy technology innovation, institutional innovation, and the concept of human survival and

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[916] Ibid.
[917] See Chapter Seven.
[918] Gov.cn. 2013. "Zhonggong zhongyang zhengzhi ju jiu tuijin shengtai wenming jianshe jinxing jiti xuexi" (The Politburo of the CPC Central Committee conducts collective study on promoting the ecological civilisation construction), 24 May, http://www.gov.cn/ldhd/2013-05/24/content_2410799.htm. Accessed 7 May 2018.
[919] Chinese name is 全国人民代表大会财政经济委员会.

> development… it is proposed to formulate a low-carbon economy promotion law in order to integrate climate change response and the development of a low-carbon economy into the legal system.[920]

However, despite the discussion of a low-carbon economy law emerging in 2010, it has yet to be formally approved or rejected. The NPC Environmental Protection Resources Committee did publish a motion in 2017 that recommended 'increased study' of a 'low-carbon economy promotion law…[and] after the conditions for the legislation become mature, incorporating that study into the legislative plan'.[921]

Nevertheless, as of 2019, it appears that the proposed law might have been shelved.[922] The legislative deliberations did include some ecological modernisation ideas that had been politically divisive, such as 'green GDP'. Green GDP's inclusion could be the reason for its legislative lack of progression as this developmental metric lost its political appeal after local backlash (see Chapter Seven). The 2017 NPC motion suggests that the proposed draft has not yet been passed into legislation primarily because relevant departments feel that the law will not add anything that other laws have not already covered.[923] For instance, the MEP felt that 'existing laws and regulations such as the PRC's *Environmental Protection Law*, the *Circular Economy Promotion Law*, and the *Cleaner Production Promotion Law* all involve and contain the promotion of low-carbon economic development'.[924] This interpretation is consistent with Xie Zhenhua's compound terminology of 'green circular low-carbon development' (see earlier section), whereby the response to climate change is considered integral to solving environmental pollution and degradation. Without high-level ministerial support, the concept of a low-carbon economy might remain a policy slogan to decarbonise China's economy, rather than a law, and this seems a strong possibility given that it has not yet been incorporated into

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[920] Quanguo renmin daibiao dahui caizheng jingji weiyuanhui. 2010. "Guanyu di shiyi jie quanguo renmin daibiao dahui di san ci huiyi zhuxituan jiaofu shenyi de daibiao tichu de yi'an shenyi jieguo de baogao" (Report on the deliberation outcome of the motion proposed by the representative regarding the chair's deliberation at the third session of the 11th National People's Congress), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid=412faca2583fe9dcbdfb. Accessed 28 May 2018.
[921] Quanguo renmin daibiao dahui huanjing yu ziyuan baohu weiyuanhui. 2017. "Guanyu di shi'er jie quanguo renmin daibiao dahui di wu ci huiyi zhuxituan jiaofu shenyi de zhuxituan jiaofu shenyi daibiao tichu de yi'an shenyi jieguo de baogao" (Report on the deliberation outcome of the motion proposed by the representative regarding the chair's deliberation at the fifth meeting of the 12th National People's Congress), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid= d851dac101df8236bdfb. Accessed 28 May 2018.
[922] Ibid.
[923] Quanguo renmin daibiao dahui huanjing yu ziyuan baohu weiyuanhui. 2017. "Guanyu di shi'er jie quanguo renmin daibiao dahui di wu ci huiyi zhuxituan jiaofu shenyi de zhuxituan jiaofu shenyi daibiao tichu de yi'an shenyi jieguo de baogao" (Report on the deliberation outcome of the motion proposed by the representative regarding the chair's deliberation at the fifth meeting of the 12th National People's Congress), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid= d851dac101df8236bdfb. Accessed 28 May 2018.
[924] Ibid.

China's environmental policy agenda to the same degree as cleaner production and circular economy.

Conclusion: China's Aspiration for a Low-Carbon Economy and Ecological Modernisation

This chapter has shown how the idea for a low-carbon economy gradually emerged with the recognition among academics and officials that climate change was a threat to China's economic development. The term took on wider economic and ecological significance than the other ecological modernisation concepts analysed in previous chapters. On the one hand, the perceived need for a low-carbon economy is similar to the environmental pollution concerns that led to the acceptance of cleaner production and circular economy, in that the Chinese government responded to the spectre of global warming with a technocratic low-carbon economy concept that bore discursive hallmarks of ecological modernisation. On the other hand, despite the public comments from senior environmental bureaucrats concerning the potential consequences from rising temperatures, the low-carbon economy concept would emerge later than those primarily pollution-orientated concepts. Even though Qu Geping had argued that 'carbon dioxide provoked rising global surface temperatures', it would take until 2005 for the CASS (with intellectual and financial assistance from the UK Government) to publish the first significant paper on the low-carbon economy. Then two years later, Chinese President Hu Jintao publicly announced the concept at the 2007 APEC Conference. This occurred three months after the State Council released China's first climate change white paper. Economic and ecological rationality regarding climate change finally had converged within China's environmental policy agenda.

China's version of a low-carbon economy conforms with ecological modernisation in two significant ways: the rhetorical balance of economic and environmental considerations, and the embrace of the market. Firstly, a low-carbon economy provided the Chinese government with a concept that could chart their sustainable development in an era of climate change. In this way, the rhetoric used to support low-carbon economy echoed the storyline used to promote cleaner production, circular economy and green GDP, namely that China needed to transition away from traditional development to sustainable development. Like those concepts mentioned in previous chapters, Chinese officials called for more ecologically-aware development, rather than measures that would constrain their developing country. Again, this idea of low-carbon development supported the process of ecological modernisation in China.

Economic rationality also underpinned Chinese official support of a low-carbon economy. The concept offered officials a discourse that suggested transitioning away from its fossil-fuel dependence. In this way, the supporters of a low-carbon economy employed the discourse of a circular economy. As Chapter Six highlighted, China's high-resource usage increased the desirability of a circular economy. In the 1980s and 1990s, China experienced resource shortages as its own mineral and energy production could not match demand from industry. These shortages were repeatedly felt because of China's geographical resource distribution: hydropower resources were in the Southwest, coal reserves in the North and load centres on the coastal fringes. Reduced electricity transmission and coal transport often failed as conduits between these regions were interrupted. As Chapter Six noted, the experience of electricity shortages peaked in 2003 and 2004 heightening these resources fears as China experienced rolling blackouts because of inclement cold weather that brought China's coal transportation to a standstill for many months. China was also now a net oil-importing nation, importing over 53 per cent of its oil in 2007.[925] Concerning low-carbon development, senior officials, such as the MEP's Li Ganjie, understood that China's resource security was at stake, with well above the global average of its primary energy derived from coal in 2011 (over 42 per cent more than the global average at that time).[926] They saw that the move towards low-carbon development and solar, wind and other renewable energies would reduce fossil-fuel dependence risk.

The economic rationality that underpinned the ecological modernisation support of low-carbon bore similar political undertones to the reasoning powerful government officials and researchers used to support a circular economy. Starting with Zhuang Guiyang, the view was expressed that China needed to undertake more action on climate change commensurate with its leading position in the international community. More specifically, there were concerns that the international community could raise 'climate barriers' on Chinese goods if the Chinese government did not have a low-carbon economic strategy in place that sought to decarbonise its economy. These economically-based fears mirrored the 'green barriers' that drove circular economy support in the lead up to China's WTO accession. China's economy had become increasingly integrated into the global economy and was thus dependent on manufacturing exports. This chapter has shown that policy experts speculated that developed countries could

[925] Oil consumption and production statistics in BP 2019. "Statistical Review of World Energy – all data (1965-2018)," https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/downloads.html. Accessed 22 July 2019.
[926] Primary energy statistics in ibid.

use this dependence as trade-based leverage to reduce China's carbon emissions. Economic rationality also increased the appeal for a low-carbon economy through the fear that the high-energy industries would be left holding investments with high levels of embodied energy. China had embarked on a rapid industrialisation and infrastructure boom since the 1980s, and senior officials understood that these investments would suffer from a 'lock-in effect'. As Wu Qiaoqing noted, China's infrastructure investments had 'service lives' of up to 50 years, so it would become highly challenging to discard investments with short service lives. This fact was especially pertinent for residential buildings, of which around 95 per cent were 'high energy buildings.[927]

The low-carbon economy concept also moved beyond the ecological modernisation concepts of the past three chapters by strengthening the role of market forces through a carbon trading scheme. As the latter part of this chapter demonstrated, Xie Zhenhua, in his position as China's lead climate change negotiator at the NDRC, called for the creation of a carbon trading scheme to help achieve a 'synergistic effect' and enhance the integration of 'different policies such as fiscal and taxation policies, legal means and market mechanisms, carbon reduction and energy conservation, and development of renewable energy'.[928] Drawing on his ecological modernisation mindset, he believed that carbon trading would allow market mechanisms to help reduce China's carbon emissions. Overall this chapter has reiterated the argument that Chinese officials have included ecological modernisation ideas into their country's environmental policy agenda. Yet their noncommittal surrounding climate change policy resulted in a concept that bore the ecological modernisation hallmarks of cleaner production, a concept that was passed into legislation in 2002. While Chinese policymakers were discussing the merits of a circular economy and a green GDP, as well as deliberating on the ill-effects of climate change, they were also exploring a new capstone environmental concept, called ecological civilisation, that would frame their future economic development. The next chapter will now examine the policy discussion surrounding ecological civilisation in China to see whether it also exhibits ecological modernisation with Chinese characteristics.

[927] Wu Xiaoqing 2010, 51.
[928] Xie Zhenhua 2013.

Chapter Nine: Ecological Civilisation in China – A Reflexive Ecological Modernisation with Chinese Characteristics?

The last chapter examined the rising anxiety among Chinese government officials towards carbon dioxide emissions and explained how this anxiety eventually led to the adoption of 'low-carbon economy' by the senior leadership in 2007. This concept provides another example of the Chinese government turning to ecological modernisation discourses as a means to make sense of balancing the twin objectives of economic growth and environmental protection. Chinese officials concluded, after a two-decade climate change debate, that the concept of a low-carbon economy provided a vision of a future Chinese economy with a reduced carbon footprint without constraining its continued growth. Low-carbon development would open up new sustainable industries and provide new employment opportunities for China's workers. Moreover, low-carbon development would avoid the risk of 'ecological trade barriers' that Chinese officials feared developed nations would place upon Chinese producers if they concluded that the Chinese government was avoiding real policy action on climate change.

This chapter will now turn its attention to the concept of 'ecological civilisation' (生态文明). The first and second section will explore the academic debate surrounding this environmental concept and situate ecological civilisation within the broader discussion of China's 'civilisation debate'. The chapter will then examine the policy discussion regarding ecological civilisation, focusing in particular on officials from the State Forestry Administration[929] (SFA) and State Environmental Protection Administration (SEPA). The chapter will conclude by studying the policy discourse of China's senior Party officials who started to use and develop the concept from 2007 onwards. Overall, this chapter argues that ecological civilisation represents, to date, the latest, most advanced and all-encompassing ecological modernisation concept yet adopted by the Chinese authorities. If, as suggested in the previous chapter, the concept of a low-carbon economy drew together earlier ecological modernisation concepts, then the idea of an ecological civilisation takes this process one *cultural* step further. In other words, its advocates wish to build on past ecological modernisation concepts such as cleaner production, circular

[929] Chinese name is 国家林业局.

economy, green GDP, and low-carbon economy to advance a concept that aligned with China's ideological and cultural history.

The Policy Discourse of an Ecological Civilisation in China

Ecological civilisation: the early academic discourse. The term 'ecological civilisation' first started to appear in the late 1980s within China's universities. The Chinese academics who first employed the concept were grappling with the same economic and ecological 'contradictions' (矛盾) concerning China's rapid modernisation raised in the previous chapters. One of the first academics to discuss ecological civilisation in detail was Liu Sihua 刘思华 from Hubei University of Technology. In a 1988 issue of *Guangxi Social Sciences,* he discussed ecological civilisation within the context of 'ecological economics' (生态经济学). Even though Liu stressed the perilous state of China's environment in his article, he also conveyed an economic rationality based on the centrality of material production. He recognised that China possessed 'economic backwardness' (经济落后), and it was 'imperative to develop the economy and quicken the process of building a "material civilisation"' (物质文明).[930] (This 'material civilisation' that Liu referred to was social and economic development that ensured the basic needs for all citizens).

However, Liu believed that the present bias towards economic development in China presented new environmental challenges, because 'the proportion of investment in material civilisation construction and ecological civilisation construction was seriously out of tune'.[931] He argued that an ecological civilisation would become necessary for China's future development. Given that 'China's pollutant emissions were some of the largest in the world', and because of its rapid industrialisation its 'pollution situation was now equivalent to the severe period of developed countries in the 1950s and 1960s', he stressed that 'as China's economic and social development and economic strength continued to increase, it must gradually increase the investment in ecological environment compensation, protection and construction'.[932] This type of investment, however, 'would not affect the continuous expansion of economic reproduction'. If the construction of ecological civilisation and material

[930] Liu Sihua 1988, 54.
[931] Ibid.
[932] Ibid, 54-55.

civilisation were promoted in harmony, then it would 'ensure the continuous development of a material civilisation' and restore China's 'ecological balance'.[933] Economic rationality dominated Li's thinking, yet he realised that ecological rationality would become more important in the future.

Writing amid China's 'retrenchment of economic reforms'[934], Liu concluded that China's future modernisation 'needed to transition to a path that strictly followed the laws of nature and economic laws' (i.e. undertake further economic liberalisation).[935] In this sense, Liu situated this concept of ecological civilisation as a later stage along the path that liberals called a 'socialist market economy'. The ecological modernisation undertone to his article was apparent in his understanding of the 'backward management' (管理落后) in China that 'resulted in high consumption, high waste and poor efficiency'. Liu stressed that 'the development of a commodity economy must improve the comprehensive utilisation of resources, improve the level of economic management, and strengthen environmental supervision and management in order to improve the development level of ecological-economic productivity'.[936] He saw the lack of market discipline as a reason for many of China's environmental ills. Liu's comments also show how the same environmental problems that underpinned the calls for cleaner production and circular economy (namely, pollution and waste) were also contributing to broader calls for China's society to shift towards an 'ecological civilisation'.

Li Shaodong 李绍东 from Sichuan's Southwest Normal University also explored the concept of an ecological civilisation in two 1990 articles. Li argued that China's 'socialist revolution' (社会主义革命) had 'not paid enough attention to' the environment and was 'ineffective in solving ecological problems caused by its social and economic activities that violated the laws of nature'. These activities contributed to an 'ecological imbalance' (生态平衡失调) that created 'ecological crises' (生态危机). Such crises were 'becoming increasingly serious' and, according to Li, were subjecting China and the world to 'daily reprisals from the natural world'.[937] He cautioned that 'the series of warnings presented by contemporary

[933] Ibid.
[934] Naughton 1995, 119-126. See also Chapter Four.
[935] Liu Sihua 1988, 47.
[936] Ibid, 48.
[937] Li Shaodong 1990, 104.

ecologists and ecological economists could no longer be ignored'. For Li, transitioning to an ecological civilisation would create a society with 'a certain basic level of scientific culture…[that] understood a bit of ecology with related knowledge about ecological systems, ecological balance, ecological design, and ecological benefits'.[938] With this knowledge, China would move away from an 'ecologically blind' (生态盲) society that worshipped 'economic utilitarianism and was "eager for quick success and instant benefit"' (竭泽而渔).

Li also introduced the notion of 'ecological morality' (生态道德观), remarking that there were specific 'standards' (标准) and 'behaviour' (行为) that Chinese citizens needed to follow in order to divert China away from its 'pollute first, clean up later style of industrialisation'.[939] Li touched on the experience of Western nations that had moved towards 'respecting nature' and that now 'challenge behaviour that damages the ecological environment'. Their experience was 'instructive for China to enhance our ecological awareness and promote ecological civilisation'.[940] Li's use of 'ecological morality' bore a resemblance to the 'environmental morality' that accompanied calls for a 'green GDP' (see Chapter Seven), though his use of the term was more targeted at society as a whole rather than local and provincial cadres. Li's conception of ecological morality, as later sections of this chapter will highlight, would appeal more to senior officials within the government. These two early academic examples demonstrate how the early discussion of ecological civilisation emerged out of the environmental problems of the late 1980s and early 1990s.

Other Chinese intellectuals would build on this early idea of 'ecological civilisation' during the 1990s. Shen Shuguang 申曙光 was a leading exponent in this decade.[941] His article on ecological civilisation is the most cited article on the topic in China National Knowledge Index. His argument drew on the preliminary conceptual foundations described above. Ecological civilisation represented a *progression* and higher form of civilisation in China that had materialised due to the contradictions in an 'industrial civilisation' (工业文明):

> Although the history of the industrial civilisation is only just over two hundred years, it has dramatically improved social productivity and created enormous material wealth. However, in the last two or three decades, industrial civilisation has fallen into a variety of complex crises, such as the decline in land, biological, mineral, forest, and energy resources.

[938] Ibid, 106.
[939] Ibid, 108.
[940] Ibid, 105.
[941] Shen Shuguang, 1994.

Shen noted that the 'Malthusian perspective' (马尔萨斯的观点) could present a bleak interpretation of the environmental ills caused by the industrial civilisation. However, he was more optimistic:

> On the whole, industrial civilisation is heading for decline. However, the trend of continuous progress in human society is irreversible. The crisis with the industrial civilisation shows its limitations and shortcomings, but it does not mean that humanity has embarked on a dead end. Any form of civilisation is only a phenomenon, a historical process, and will eventually die out and be replaced by a new civilisation. The day of the decline of industrial civilisation is the time when the new civilisation forms sprout and grow. We believe that the civilisation that leads the human society to continue to develop by replacing industrial civilisation is ecological civilisation… Relying on the continuous development of science and technology, we will carry out moderately-scaled social production and consumption to meet people's material needs, spiritual needs and ecological needs, improve the overall quality of human beings, and realise the sustainable development of society, nature and humanity.[942]

Shen saw the period of decline as a chance to reconceptualise the place of humanity within nature and alter the 'philosophical underpinning' (哲学依据) of society. Humanity had operated according to the belief that it had the 'capability to control and conquer nature'. However, an ecological civilisation adopted the 'philosophical perspective' (哲学观点) that 'man was a part of nature' (人是自然的员). Even though he did not explicitly use the term, he pointed to the example of circular economies to show that 'such ecological processes that can convert "raw material to product to waste back to raw material" (原料一产品一废料一原料). This process would change waste into raw materials, realise reproduction and fundamentally solve the pollution problem caused by industrial production'.[943] Before exploring the official policy discussion of ecological civilisation, it is vital to understand how the concept became entrenched within Chinese political and government discourse.

Situating 'ecological civilisation' within the broader 'civilisation' debate. Ecological civilisation was incorporated into the broader 'civilisation discourse' that characterised the debates surrounding China's post-Mao social and economic modernisation.[944] The term 'civilisation' (文明) was borrowed from the Japanese in the 19th century and was used by 'self-strengthening' (自强) modernisers in the final throes of the Qing Dynasty at the end of the nineteenth and beginning of the early 20th century.[945] It was used as distinct from 'culture' (文化) and 'referred largely to non-Chinese notions of progress and, by some, to signify the improvement of the imagined flawed Chinese cultural character'.[946] Deng Xiaoping and his

[942] Ibid, 31-32.
[943] Ibid, 32.
[944] Dynon 2008; Lin 2017.
[945] Dynon 2008, 89.
[946] Ibid.

supporters in the early 1980s resurrected the term and conflated it with notions of material and spiritual development in the early stages of the Reform Era. The specific terms they used were 'material civilisation' (物质文明) and 'spiritual civilisation' (精神文明) (referred to as the 'two civilisations' 两个文明). Deng used these twin concepts to frame 'reform and opening up' as a positive experience that 'co-located capitalist wealth with spiritual wealth'.[947] China's reform leaders understood that capitalism would alter China, but they also believed that as long as they paid attention to maintaining specific moral codes, then capitalism would result in positive changes. For instance, then CCP General Secretary Hu Yaobang 胡耀邦 noted in 1987 that China sought 'a spiritual civilisation, as manifested in a higher educational, scientific and cultural level and higher ideological, political and moral standards'.[948]

These notions of 'civilisation' underwent a new iteration during the latter stages of Jiang Zemin's term as CCP General Secretary (1989-2002). He broadened the 'two civilisations' to include a 'political civilisation' (政治文明) with the Central Committee's 1996 *Resolutions Concerning a Certain Number of Important Questions Regarding the Strengthening of the Building of Socialist Spiritual Civilisation* – referred to as 'three civilisations' (三个文明) or 'three parts, one whole' (三位一体).[949] Political civilisation referred to reforming the administration and governance of China in a manner that strengthened rather than weakened the rule of the CCP. President Jiang later sought to use his 'three represents' theory to position the role of the CCP as an integral element in China's socialist modernisation. The inclusion of the term political civilisation provided an additional conceptual pillar to his theory, with the ideological (spiritual) and economic (material) pillars previously established by Deng.[950]

The next iteration of the 'civilisation concepts' occurred during the early years of the Hu Jintao Administration when the then-Chinese president reformulated it to include 'political' (政治), 'economic' (经济), 'cultural' (文化) and 'social' (社会) civilisations. Hu Jintao incorporated 'social civilisation' with the other concepts (referred to as 'four in one' 四位一体) at a high-level cadre study meeting in 2005. His notion of social civilisation was adopted

[947] Ibid, 90.
[948] Ibid, 88.
[949] Ibid.
[950] See Chapter Four.

as the ideological pillar to bolster his aim to create a 'harmonious society' (和谐社会) in China.[951] This pillar was necessary due to the realisation that China's socialist modernisation had created economic inequalities, which the Party promised to manage more carefully in the future.

Finally, at the 2012 18th Party Congress, Hu Jintao incorporated the idea of 'ecological civilisation' within what was now termed 'five in one' (五位一体). In particular, President Hu stated in his last speech as CCP General Secretary that China should 'fully implement the overall five-in-one layout of economic construction, political construction, cultural construction, social construction and ecological construction.[952] From a policy perspective, however, the following section will outline how ecological civilisation developed simultaneously from both the SFA and the SEPA. Officials from each of these government agencies placed their own spin on the concept, reflecting their bureaucratic organ's policy portfolio. Eventually, the Chinese political leadership would adopt this spin, signalling that their future development was in tune with ecological modernisation principles.

New supporters of ecological modernisation: the State Forestry Administration and ecological civilisation. The discussion below will outline how government officials from the newly-created SFA began actively promoting 'ecological civilisation' around 1998.[953] Although the SFA had been placed in various bureaucratic guises since 1958, the State Council formally created it in 1998 during their broader administrative reshuffle of government departments. The SFA was tasked with managing and growing China's forest reserves, which had been severely depleted by excessive-felling during the Maoist era. The State Council also tasked them with preventing soil erosion and desertification as well as conserving biodiversity.[954] As this section will show, ecological civilisation provided SFA officials with a

[951] Dynon 2008
[952] Ni Yangjun. 2012. "Shiba da xuanshi "wu wei yiti" tou chu sha xinhao?" (The 18th National Congress declared "five in one": revealing what signal?), Renmin wang, 12 November, http://cpc.people.com.cn/pinglun/n/2012/1112/ c241220-19552152.html. Accessed 15 July 2018.
[953] Wang Chengzu 1998; Shi Feng and Yang Xudong 1998.
[954] Guowuyuan bangong ting. 1998. "Guanyu yinfa guojia linye ju zhineng peizhi nei she jigou he renyuan bianzhi guidìng de tongzhi" (Notice on printing and distributing the provisions for the establishment of internal functions and staffing of the State Forestry Administration), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid=45f97eb6abfa7653bdfb. 15 July 2018.

conceptual framework that led them to believe that China could maintain and grow its forests in a manner that was both economically and environmentally sustainable.

In 1998 Wang Chengzu 王成祖 was one of the first SFA researchers to broach the concept of ecological civilisation publicly within his position as vice-director of the SFA's Economic Development Research Centre. Two other researchers from the SFA's Comprehensive Planning Department had also broached 'ecological civilisation' that same year, Shi Feng 石峰 and Yang Xudong 杨旭东.[955] The following discussion focuses on Wang because he expressed the ideas and rationale behind ecological civilisation in more detail, even if he lacked a precise definition of 'ecological civilisation'.[956]

The underlying message of Wang's 1998 article in *Forestry Economy* was that China needed to boost its forest stocks in a sustainable manner. He acknowledged that China's forestry industry had 'obtained remarkable achievements' throughout the second half of the century with the 'annual planting of 2.4 billion trees'.[957] These achievements had resulted in 'total growth of forest resources greater than consumption, exhibiting the development of "double growth" in forest area and stock volume'. However, he conceded that 'as it approached the 21st century… its ecological environment was deteriorating'.[958] Despite the improvements in forestry management, the forests still suffered from the historical 'poor management' (管得差) under Mao when excessive felling of trees for lumber and firewood was commonplace. China's population growth was a significant problem in this regard. Wang noted that China's 'per capita forest area and stock levels are only 15 per cent and 12 per cent of the world's per capita level, respectively; the forest coverage rate is only half the world level (the world average is 25 per cent)'. He stressed that China's forestry industry 'could not compare with forestry in developed countries' and, if taken in this context, it 'still was a low forest nation', meaning that its forest resources were scarce.[959] On this basis, he argued that China's agricultural areas were suffering from a crisis regarding the 'survivability of the land' (生存之地). China could no longer rely on its land to support its modernisation and growing population. Due to population growth,

[955] Ibid.
[956] Wang Chengzu 1998
[957] Ibid, 2.
[958] Ibid.
[959] Ibid, 3.

there was less arable land for China's then 1.2 billion citizens – a fact exacerbated by increased soil erosion, desertification, and water supply issues. These ecological issues led to 'economic losses' (经济损失). For instance, he remarked how wind erosion and desertification led to 'the direct annual economic losses of 45 billion yuan'.[960] Wang's comments reflect an ecological awareness of the problems that arise when forests are managed unsustainably. They also supported the use of green GDP measurements.

Wang broadened out his discussion of China's forests and ecological civilisation to a more extensive criticism of China's style of development, while still exhibiting economic rationality. He understood that 'the industrial revolution had created a new era of large-scale machine production' and that 'the emergence of modern industry represented by machines had fundamentally changed the face of the world and created and accumulated rich material wealth for the society'. However, he also claimed that this 'industrial development had led to global resource shortages, energy crises, environmental pollution and ecological damage'.[961] Wang linked these problems to the idea of 'ecological civilisation' by stating that the transition from an 'industrial civilisation' (工业文明) to an 'ecological civilisation' represented 'an inevitable trend in human history'.[962]

For Wang, ecological civilisation was a society that treated 'the ecological environment as the lifeline of ecological agriculture, forestry and industrial development', and presented 'ecological agriculture, forestry and industry as the survival line of development for humans'.[963] For the forestry industry, ecological civilisation would result in less indiscriminate felling of trees and would boost conservation. He believed that 'beautiful mountains and rivers were an important symbol of ecological civilisation'.[964] He concluded with a call on 'ecological industry' (生态工业) to accompany the 'inevitable trend towards an ecological civilisation'.[965] Wang was articulating the emergent intertwining of ecological economics and ecological modernisation thought in China. This was enhanced through his belief in the efficacy of 'green

[960] Ibid.
[961] Ibid.
[962] Ibid, 8.
[963] Ibid, 11.
[964] Ibid, 1.
[965] Ibid, 11.

markets' (绿色市场) and 'green industries' (绿色产业), which took into account the environment. He considered this 'the only way for China's new modern industrial civilisation' because the 'the traditional development model had become unsustainable and new development strategies needed to be chosen'.[966]

The head of the SFA's Discipline Inspection group Yang Jiping 杨继平 also published an article in 1999 that touched on many of the same environmental problems as Wang Chengzu such as deforestation, soil erosion, desertification and water scarcity. Yang also stressed the importance of forests within the broader ecosystem:

> Forests are a core part of terrestrial ecosystems. They store carbon dioxide in the earth. They are an essential buffer for controlling global warming. They are a lever of the global biogeochemical cycle. They protect the ecological security of the nation. They are a bond between man and nature and the basis for the sustainable development of human society. At the same time, they also have many functions, such as preventing windblown sand, maintaining soil and water, conserving water sources, purifying air, preventing pollution, beautifying the environment, curbing droughts and floods, regulating runoff and climate, ensuring the production of garments and the efficiency of water conservancy facilities, and meeting economic construction.[967]

Yang's comments reveal he was attuned to the fact that China had still yet to undertake the same economic developmental stages as developed nations and historical experience had shown that had 'destroyed natural systems before restoring them'.[968] China's 'material standard of living' (物质生活水平) was still behind 'developed nations' and needed to catch up to these countries. This posed a range of ethical dilemmas for China's policymakers.

Yang was not confident that China would 'catch up' to developed nations and avert these environmental calamities unless it initially became an 'ecological civilisation'. Only in this manner could they avoid the historical forms of devastation visited on the ecology of the developed nations. He based this belief on an interpretation of the different timeframes of economic and ecological crises. Economic crises last for 'eight to ten years', but ecological crises could last 'for hundreds of years or even longer', emphasising that short-term thinking could result in environmental despoliation that lasts multiple generations. He used soil erosion on the banks of the Yangtze River and Yellow River to demonstrate his point, describing how the rehabilitation of these banks would take several decades. China's forests also showed the long-term effect of ignoring ecosystems. Yang bemoaned the fact that 'after 50 years of hard work' China's forests had only 'increased by 1.4 per cent'. China's economy would 'double in

[966] Ibid.
[967] Yang Jiping 1999, 5.
[968] Ibid, 3.

two decades', but to double the current forest coverage rate would take hundreds of years. This meant that Chinese authorities and the forestry industry needed to treat the ecosystem as an environmental asset as well as an economic asset.[969] Here Yang's comments reveal a desire to sustainably balance the economic and ecological aspects of China's forests.

Senior officials within the SFA continued to promote ecological civilisation in published articles and speeches up until 2002. For instance, in the SFA's research journal *Forestry Economics*, Lei Jiafu 雷加富, the deputy director of the SFA, maintained a reflective approach to development that intertwined with ecological modernisation discourse. He argued that 'humanity after experiencing primitive civilisations, agricultural civilisations, and industrial civilisations had entered into the twenty-first century of ecological civilisation construction'.[970] Lei saw ecological civilisation as a concept that would allow China to view its ecosystem, in particular its forestry resources, within a long-term perspective. An ecological civilisation would become an increasingly important concept for China's forestry industry, because its resources were 'insufficient', 'of low quality', 'excessively consumed' and 'slowly developed'. In particular, he pointed out that China's 'forest coverage rate' was 63 per cent of the global average, but if taking into account China's larger population, its forest coverage per capita was 20 per cent of the global average.[971] In this manner, ecological civilisation was also linked to the concept of sustainable development:

> Ecological civilisation's overall, ecological and economic value emphasises "nature (自然) – economy (经济) – society (社会)". It promotes sustainable development of society, the maintenance of our global environment, and stresses that human development should not threaten the integrity of nature and the survival of other species.[972]

Vice-director Lei believed that the 'sustainable development of forests was an important part of the construction of ecological civilisation' due to forests' 'dual mission of maintaining ecological balance and promoting economic development'.[973]

Like other Chinese adopters of ecological modernisation, Lei looked abroad for inspiration to manage China's forest. In particular, he argued that China needed to look to the examples

[969] Ibid, 4.
[970] Lei Jiafu 2001, 5.
[971] Ibid, 6.
[972] Ibid, 5.
[973] Ibid, 6.

of sustainable use of forests in Western Europe. He believed that Western Europe had successively managed the 'three benefits' of economic, environmental and social benefits (see Chapter Five) through their established 'close to nature forestry' (近自然林业). However, they also 'obtained operating profits' from their forests.[974] The lesson from Western Europe was that China needed to manage its forests for the long-term and avoid short-term 'predatory operations' (掠夺式经营). However, Lei also argued that China could look closer to home for sustainable ideas, such as the example of China Jilin Forestry Industry Group[975], which he believed provided an example of ecological civilisation due to its sustainable business model. In 1994, China Jilin Forestry Group was 'separated from the government' (政企分开) and by 1998 listed on the stock exchange. From January to August 2001, the company had 'achieved a revenue of 1.1 billion yuan despite a decrease of 100,000 m^3 in timber sales with a sales income of 70.94 million yuan, an increase of 8.31 per cent over the same period in 2000'; and they 'realised a profit of 204.8 million yuan, an increase of 54 per cent over the same period in 2000, while achieving a reduction in production'.[976] This example, Lei argued, showed that companies that operated on ecological industrial principles could achieve higher profits without a commensurate increase in their environmental impact. Lei's example of China Jilin Forestry Group illustrated how the ideas of ecological modernisation could underpin support of ecological civilisation. Within the broader context of China's forests, an 'ecological civilisation' in China would sustainably manage forests by utilising market principles to achieve higher profits and revenue as well as lower production, effectively achieving the 'decoupling' expected from a circular economy.

In 2002, Lei's superior at the SFA, Zhou Shengxian 周生贤, also publicly promoted ecological civilisation, arguing that it was integral to achieving sustainable development. Zhou was the head of the SFA and vice-chairman of the National Greening Committee.[977] He started his career as a middle school teacher in the 1970s after joining the CCP and then rose through the ranks of the Ningxia provincial government, assuming the rank of vice-governor before transferring to the SFA in 1998. Zhou would later become the minister in the Ministry of

[974] Ibid, 6-7.
[975] Chinese name is 中国吉林林业集团.
[976] Ibid.
[977] Chinese name is 全国绿化委员会.

Environmental Protection.[978] It was in his position as director of the SFA that he wrote a 2002 article calling for the concept of 'ecological civilisation' to help 'realise socialist modernisation by the middle of the [21st] century':

> China must recreate beautiful mountains and rivers, promote the harmonious development of man and nature, and realise the integration of economic growth and ecology. It must be noted that the long-term destruction of natural ecology in history has severely constrained economic development in many areas of China today, and some areas may even be difficult to survive because of poor ecological conditions. The course of action that sacrifices ecology for economic growth does not create wealth but creates disasters.[979]

Like Lei Jiafu, Zhou viewed the need for ecological civilisation as pressing because of the imbalance between economic and ecological rationality that led to rampant 'deforestation' and less-than-optimal management. For China to continue its rapid economic development, it could no longer ignore environmental degradation as this would only 'create disasters'. He further noted that

> in the 21st century, humanity has already gradually awoken from the punishment of nature caused by long-term demands, damage and suffering. A new concept has emerged from the destruction of nature. From then on, humanity will enter a new stage of ecological civilisation following agricultural civilisation and industrial civilisation. Harmony between man and nature is the main feature of ecological civilisation. This is a vital part of modern civilisation and an essential part of an advanced culture.[980]

With this statement, Zhou elucidated one of the more precise definitions of ecological civilisation by a SEPA official. He linked it to the Confucian concept of 'harmony between man and nature' to situate the concept within Chinese classical philosophy. While the critical aim of Zhou's article was to outline his administration's efforts and strategies for 'reforestation' (造林), his broader argument about development was that China needed to adopt more environmentally-aware development strategies as well as alter its societal outlook towards the preservation of nature. In another 2002 article, he was more explicit on this latter requirement, arguing that the construction of an ecological civilisation would lead to the 'cultivation of morals' for both society and individuals.[981] He did not expand on this concept, leaving it as a general statement. However, SEPA official Pan Yue would expand on this idea of ecological civilisation and environmental morality and culture, as the following section will show.

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[978] Xinhua wang. 2013. "Huanjing baohu bu buzhang zhoushengxian jianli" (Environmental Protection Minister Zhou Shengxian's resume), 18 March, http://www.xinhuanet.com//rwk/2013-03/17/c_115053783.htm. Accessed 23 June 2019.
[979] Zhou Shengxian 2002a 3.
[980] Ibid, 3.
[981] Zhou Shengxian 2002b, 25.

Zhou did not neglect the economic function of forests, arguing that China needed to value them in a manner that 'maximised the ecological and social benefits of forests while still meeting society's need for wood as much as possible':

> Natural forests have an essential function that cannot be compared with plantation forests. They regulate climate, conserve water sources, maintain water and soil, protect biodiversity, and maintain ecological balance. They are an irreplaceable renewable resource. China's existing 100 million acres of natural forests, most of which are at the source of large rivers, play a significant role in maintaining national ecological security. Their ecological value is incalculable, and it is imperative to protect these precious natural forest resources by stopping the commercial harvesting of wood forests. The supply of wood will decrease, and the demand will increase with economic growth, the contradiction is quite sharp. To protect China's natural forest resources, we must make significant adjustments to China's forest utilisation structure, increase plantations, use less woodland to produce more wood, and gradually realise the replacement of natural forests by harvested plantations, solve the contradiction between supply and demand of wood, and truly protect natural forests.[982]

Like other Chinese advocates of ecological modernisation, Zhou's comments reflected an interlinking of economic and ecological rationality. He explicated this through a discussion of 'commercial forests' (商品林). China's forests, he argued, would benefit from 'market behaviour' (市场行为). The Chinese government needed to 'consciously utilise market mechanisms and economic methods to widely mobilise the enthusiasm and creativity of the whole society towards afforestation'.[983] Zhou's argument represented ecological modernisation in that it appreciated the pivotal role that 'market behaviour' has in protecting and sustaining natural resources.

Overall, the policy discourse of SFA officials shows that their support of ecological civilisation stemmed from the view that China needed to balance both economic and ecological rationality in the management of its forests. This section has shown how the SFA drove the early *policy* discussion concerning 'ecological civilisation'. Their contribution towards the ecological civilisation debate stemmed from bureaucratic opportunism, which allowed them to advance ecological modernisation ideas within the forestry industry, through supporting market principles. Looking at the experience of developed nations, SFA officials saw these ideas as a way to advance more sustainable use of their forest resources. Their involvement also reflected how ecological modernisation ideas had become more commonplace within China's bureaucracy. However, despite their input, it would take the principal progenitor of

[982] Ibid.
[983] Ibid, 26.

ecological modernisation ideas within China's environmental policy agenda, the SEPA, for ecological civilisation to be fleshed out more conceptually and given greater prominence.

The State Environmental Protection Administration and ecological civilisation. The SEPA, China's lead environmental protection agency, also took notice of ecological civilisation around the turn of the millennium. Cao Fengzhong from SEPA's Environmental and Economic Policy Research Centre was one of the first SEPA policy officials who publicly raised ecological civilisation in a 1999 article titled 'Globalisation and Sustainable Development'. Cao's initial contribution, and the discussion that followed from his colleagues, shows again the significant role of SEPA in advocating for an ecological-modernisation approach to the Chinese environmental policy agenda. Cao's article stemmed from the 'ecological civilisation' debate driven by Shen Shuguang (see earlier section) and he devoted a sub-section of his article to the concept.[984] The empirical context of his article was similar to many of the other articles that he and his colleagues wrote at that time concerning environmental protection: China needed to transition from a 'traditional modernisation development strategy' to one that operated according to 'sustainable development' principles.[985] These articles would form the basis for support of cleaner production, circular economy and green GDP.[986] The added context of this article was 'economic globalisation', which he saw as a new phenomenon that would bring more economic prosperity as well as contribute to increased domestic and global environmental problems. The Chinese government was in the midst of negotiations for WTO membership. Environmental policy researchers were seeking to understand how China should respond as it further integrated itself into the global economy with WTO accession.

Cao noted that many 'global environmental problems such as ozone depletion, acid rain, desertification, marine pollution, species extinction, and climate warming had already broken through national borders and became major issues affecting the survival of all mankind'.[987]

[984] Cao Fengzhong 1999.
[985] Shen Shuguang 1994.
[986] See Chapters Five, Six and Seven.
[987] Cao Fengzhong 1999, 3.

The language that he used in his article also suggested that he believed ecological rationality had been lacking in 'traditional development'. For instance, he explained that:

> from the development of traditional industrial civilisation to the development of modern ecological civilisation, traditional industrial civilisation is based on the idea that "man is the master of nature" (人是自然主人). Therefore, development is demonstrated by economic profits obtained by the human subjugation of nature, ignoring the loss of natural capital and the maintenance of natural development and those who destroy the ecological environment to be justified and legal. This anti-nature development method can only deal with environmental resources and other problems faced by human beings in a tinkering manner, and it cannot solve the problem.[988]

He further noted that a 'modern ecological civilisation believes that this kind of development does not take into account the cost towards nature', and that because it 'sacrificed nature' it could not be considered 'real development' (真正的发展). However, because ecological civilisation saw 'man as part of nature' (人是自然一员) and incorporated 'natural, social, economic, and cultural factors', it could achieve 'truly sustainable development'.[989] The environmental ideas he raised in his article mirrored many of those he also raised in other articles about cleaner production and circular economy, reflecting the broader narrative of ecological modernisation ideas that bound his work.

Later that same year, Cao collaborated with his colleague in the SEPA, Zhou Guomei 周国梅, to write a more in-depth account of the value of the concept of ecological civilisation. Their article stressed that China 'must realise the leap from the industrial civilisation to ecological civilisation' and that China needed to 'abandon the trite view that one can simply pursue production value and volume without paying attention to consumption or efficiency'.[990] They believed that ecological civilisation would help undertake 'a major shift in values' and 'human cognition' in China and lead to the abandonment of traditional economic values and the adoption of 'ecological economic' values:

> In short, ecological civilisation will readjust human behaviour… gradually improving the operational ecological value evaluation index system making the people's ecological consciousness resolute. Ecological civilisation will allow social norms to take shape, establishing conservation-oriented ecological productivity and production methods, and a new ecological, economic order. It will achieve a positive ecological cycle and ensure sustainable development. The establishment of this new ecological, economic order depends on the guidance of ecological economics. Ecological economics is a combination of a new concept of survival and development. Focusing on the strategic heights, it carefully combines the overall interests of economic development with local interests. The combination of ecological and economic benefits achieves the optimisation of ecological and economic benefits. It can be said that ecological economics is political economy and the economics of survival in the stage of ecological civilisation.[991]

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[988] Ibid.
[989] Ibid.
[990] Cao Fengzhong and Zhou Guomei 1999, 9.
[991] Ibid.

Cao and Zhou presented an integrated account of China's environmental problems and its future economic development that bore many similarities with ecological modernisation, primarily through the convergence of economic and ecological rationality. Indeed, the rest of their article elaborated on these notions of ecological economics and ecological civilisation by theorising on how China would achieve future economic growth. The following excerpt suggests the strong ecological modernisation basis to their views:

> China's modernisation… must take the concept of ecological civilisation as its direction and liberate and develop productive forces in the sense of ecological civilisation. To liberate productive forces is to promote institutional innovation. To develop productive forces is to vigorously promote scientific and technological progress, especially the development of new energy development and environmental protection technologies. The former rationalises relationships between people, and the latter regulates the relationship with people and nature.
>
> Regarding China's economic growth, social development and progress, the key function of ecological valuing centres on the protection of resources and the rational and effective use of resources, because it is the basis for increasing and decreasing the rate of economic growth and evaluating developmental standards. To realise sustainable development, China needs to shift from an economic development strategy of extensive resource development and come up with an economic development strategy of rational protection and intensive development of resources. The essential part of implementing this strategy lies in the definition of environmental resource property rights. Only by assetisation (资产化) and pricing (价格化) of ecological resources, can the social economy be allowed to operate and develop an ecological civilisation. Therefore, the ecologicalisation of scientific and technological innovation, the assetisation and pricing of ecological and environmental resources, and the ecologicalisation of the national consciousness are the only paths for China's sustainable development.[992]

Beyond their reflexive take on development and the need to change societal behaviour, they saw the market as the means to not only protect the environment but also to 'liberate productive forces'. Moreover, for China to conserve its resources, it would have to value them as assets, property rights and prices. In other words, the market was needed to ensure that China 'rationally utilised' its resources sustainably. They also hailed science and technological innovation as a pathway to sustainable development if it underwent 'ecologicalisation' (生态化). However, what is striking about their comments is how notions of 'progress' provide the basis for their ecological modernisation outlook. They believed that ecological civilisation could occur as a *stage* of this progress. The critical policy point was how to hasten its arrival.

These ideas concerning ecological civilisation floated by Cao and Zhao soon came to the attention of more senior officials within the SEPA. The political context to these discussions involved comments made by Chinese President Jiang Zemin on the 80th anniversary of the CCP in 2001 – the same speech in which he introduced the 'three represents'.[993] Alluding to

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[992] Ibid, 9.
[993] See Chapter Four and earlier discussion in this chapter.

the environmental pressures that had plagued China's development over the two decades of the reform period, Jiang stated that in future the Party 'must promote harmony between man and nature and enable people to work and live in a beautiful ecological environment'. He also called for the Party to ensure that China 'correctly handles the relationship between economic development and population, resources, and the environment to improve the ecological environment and beautify the environment…by opening up a civilised development path with productivity, prosperity in life, and good ecology'.[994] While Jiang did not explicitly use the term 'ecological civilisation' in this speech, it laid the ideological foundation for China's policymakers to discuss concepts that sought to change the nature of Chinese *attitudes* towards the relationship between ecology and society.

Xie Zhenhua the director of SEPA, whose ideas on a low-carbon economy were discussed in the last chapter, latched onto Jiang's speech at the 16th Party Congress in order to further promote 'ecological civilisation' in an issue of *Seeking Truth.* He developed the concept by positioning it within the larger narrative of China's socialist modernisation. According to Xie, ecological civilisation was 'a major innovation and important fulfilment of Marxist theory' as well as 'an important element in the overall development of mankind'. It would also help meet Jiang's objective that 'environmental awareness and environmental quality would become an important indicator for the degree of a nation's civilisation'.[995]

Xie devoted an entire section in this article to an ecological civilisation. Indeed, he was prepared to deal in greater depth than Lei Jiafu, Cao Fengzhong and Zhou Guomei on the importance of ecological civilisation for Chinese development:

> The industrial revolution has enhanced humans' ability to transform nature, but in more than a century, it took to create unparalleled colossal material wealth, there also was a substantial environmental cost. The concept of ecological civilisation is a brand-new scientific concept of a civilisation formed from a profound understanding of the relationship between man and nature after thousands of years of agricultural civilisation and industrial civilisation within human society. It is not only an inheritance of the ancient natural concept of "harmony between man and nature", but it is also a reflection and awakening of the natural view of heaven and man. It is a moral and ethical foundation of the strategy of sustainable development and represents the direction for an advanced culture. Integrating the concept of ecological civilisation into the construction of spiritual civilisation is conducive to strengthening the building of socialist ideology and morality. The popularisation of ecological civilisation will further improve the spiritual and cultural quality of workers and promote the development of advanced productive forces.[996]

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[994] Jiang Zemin. 2001. "Jiang Zemin zai qingzhu jiandang 80 zhounian dahui shang fabiao zhongyao jianghua" (Jiang Zemin delivers an important speech at the celebration of the 80th anniversary of the founding of the CCP), CCTV, 1 July, http://www.cctv.com/special/777/3/52342.html. Accessed 23 May 2018.
[995] Xie Zhenhua 2001, 14.
[996] Ibid.

Xie's definition of ecological civilisation also reflected an ecological modernisation ethos. This manifested itself in a reflexive understanding of the environmental problems inherent to China's previous industrialisation and the future need to realise sustainable development. This ethos is also apparent in Xie's recognition of the role that capitalism would play in achieving an ecological civilisation. Although he neglected to mention many of the market-aspects touched on by Cao Fengzhong and Zhou Guomei, he did discuss 'advanced productive forces' (i.e. capitalism), as well as the importance of 'market mechanisms'.

Xie believed that if China was to achieve this sustainable development, then it needed to further build a 'moral and ethical foundation' for its 'leading cadres' and 'youth'. The nation also needed to improve 'environmental awareness for the whole society' and further foster an 'active environmental culture'. His discussion of morality, ethics and a 'spiritual civilisation' added significant political undertones to his remarks. After all, these were the same views that formed the foundation of calls for green GDP (see Chapter Seven and below). Xie suggested that the success of ecological civilisation was predicated upon its successful integration into the Party's Marxist canon, giving it a 'scientific' historical meaning.[997] Xie's comments were also a broad recognition that for sustainable development to be achieved then environmental governance needed to incorporate all aspects of society through the creation of an ecological civilisation. Xie argued that ecological civilisation needed to become further entrenched within the CCP's *materialist* view of history.

In 2003, Xie Zhenhua's colleague at SEPA, Vice-Director Pan Yue, appended 'ecological civilisation' to his call for an 'environmental culture' in China. This was the same article in which he first called for China to establish a green national accounting framework.[998] He stated that China's environmental problems had forced people to:

> begin to re-examine the traditional industrial civilisation and rethink its various ills to get rid of the various crises it caused, to replace green with black, and to replace traditional industrial civilisation with a new ecological industrial civilisation. Therefore, the ecological crisis creates an environmental culture. The core of environmental culture is ecological civilisation. Environmental culture is today's advanced culture.[999]

[997] It could also reflect the journal he chose to outline these views: *Seeking Truth.*
[998] See Chapter Seven.
[999] Pan Yue 2004b, 46.

As noted in Chapter Seven, Pan also sought to link China's 'traditional culture' (传统文化) to China's 'environmental culture'. In that same article, he linked China's traditional culture to 'ecological civilisation':

> The inner spirit of Chinese traditional culture is strikingly consistent with the emerging environmental culture of today's world. As we all know, Chinese traditional culture has always pursued harmony with nature…Based on this spirit, traditional Chinese philosophy of religion, literature and art, medicine and health, chess and tea ceremony all show the affinity between man and nature. They express a profound and wise ecological civilisation and are without exception soaked with a harmonious beauty of heaven and earth.[1000]

Moreover, like his other colleagues at SEPA, Pan's article reflected an ecological modernisation understanding of development. His use of 'ecological crisis' suggests that he supported a high degree of ecological rationality concerning the establishing effects of traditional industrialisation. Moreover, his argument revealed a high degree of reflexive thought concerning 'traditional industrial civilisations' and how its 'various ills' had led to 'ecological crises'. Yet, this crisis had also prompted an 'advanced environmental culture'. This once again reflects how Chinese officials had sought to reflexively interpret China's environmental problems within the larger narrative of China's development.

Pan's speech at the 2005 Green China Forum sought to reinforce the ideological case for ecological civilisation and, like Xie Zhenhua in 2001, he linked the concept to China's socialist modernisation. This argument was expressed in his statement that China's socialist modernisation needed to straddle the balance between 'extreme anthropocentrism' (极端人类中心主义) and 'extreme ecocentrism' (极端生态中心主义):

> China's socialist modernisation needs to straddle the balance between two extremes civilisation reflects the basic principles of socialism. Socialist ecological civilisation first emphasises people-oriented principle. At the same time, it opposes extreme anthropocentrism and extreme ecocentrism. Extreme anthropocentrism has created a severe crisis of human survival; extreme ecocentrism has overemphasised the need for human society to stop the transformation of nature. Ecological civilisation principles believe that people are a core value, but not the masters of nature. Man's all-encompassing development must promote harmony between man and nature. Besides, ecological civilisation is also basically consistent with the principles of contemporary socialism concerning sustainable development, fairness and justice.[1001]

In outlining the key characteristics of ecological civilisation, Pan advanced the ecological modernisation principle that humanity is a central guiding principle of development while emphasising that humanity was 'not the master of nature'.

[1000] Ibid, 48.
[1001] Pan Yue 2006, 1.

Yet, more importantly for the purpose of this thesis, Pan showed how China's officials could incorporate this concept into their particular socialist ideological circumstances. Ecological civilisation was taken to represent a higher stage of socialism. Therefore, with that ideological punctuation, it fell upon China's officials to construct an official version of ecological civilisation. They needed to create the process of ecological modernisation, but this time they were constructing what can be considered a capstone ecological modernisation concept, one which embraced all the other concepts explored throughout the last five chapters. The next section illustrates this point also by showing how senior Party officials took the debate beyond mere slogans and gave it policy substance. This will suggest that ecological civilisation became a fundamental concept in the ongoing struggle to maintain the legitimacy of the CCP.

Senior CCP politicians and ecological civilisation. With the forestry and environment sections of China's bureaucracy providing the early foundation for ecological civilisation, the term finally was placed on the Party-political stage in 2007 when President Hu Jintao first used the term at the 17th National Party Congress. In his speech at the Great Hall of the People, Hu announced to the attending Party delegates:

> The basic shape of ecological civilisation is an industrial structure and growth and consumption patterns that conserve energy resources and protect the environment. Circular economies become comparatively higher in scope, and the proportion of renewable energy rises. The discharge of significant pollutants is adequately controlled, improving the quality of the environment. The concept of ecological civilisation is firmly established as belonging to the whole of society.[1002]

Hu's remarks paraphrased many of the claims that Xie Zhenhua had made in his article six years earlier and cited above. However, it was his use of the term at the Party Congress that provided the political imprimatur needed to entrench the term firmly within China's political discourse.

The importance of ecological civilisation is that it has survived the transition in Party leadership from Hu Jintao to Xi Jinping. It has now transitioned to become a 'new guiding thought' for the Chinese Communist Party. In 2018, the PRC Constitution was revised to reflect this conceptual transition: 'promote the coordinated development of material civilisation,

[1002] Hu Jintao. 2007. "Hu Jintao zai dang de shiqi da shang de baogao (quanwen)" (Hu Jintao's report at the Party's 17th National Congress (full text)), China Daily, 25 October, http://www.chinadaily.com.cn/hqzg/2007-10/25/content_6205616_4.htm. Accessed 27 June 2018.

political civilisation, spiritual civilisation, social civilisation and ecological civilisation'.[1003] In 2015, the State Council and Central Committee jointly released *Opinions on Accelerating the Ecological Civilisation Construction,* and five months later, they followed that up with their joint *Integrated Reform Plan for Promoting Ecological Civilisation*.[1004]

Highlighting its capstone function as a guiding principle behind sustainable development in China, the State Council also stated that 'existing laws and regulations needed to be revised' if they were 'incompatible with accelerating the construction of ecological civilisation'.[1005] Using these policies, Chinese authorities have sought to integrate all the environmental reforms that China has experienced over the past few decades into a larger narrative of 'progress'. The term ecological civilisation helps to place the Party at the vanguard of the forces of history.

The key elements that constitute ecological modernisation materialise in these documents. For instance, the techno-optimistic narrative arises with the exhortation that China must 'further innovate in science and technology'.[1006] Moreover, the belief in the decisive role that markets can play in environmental governance and ecological restructuring arises: 'cultivate market players for environmental governance and ecological protection' and 'adopt institutional mechanisms and policy measures to encourage the development of energy conservation and environmental protection industries'. This State Council policy illustrates the capstone nature of ecological civilisation. It also incorporates most of the concepts that order the chapters of this thesis: 'development must be green development, circular development, low-carbon development, and balance development and environmental protection'.[1007] The

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[1003] 2018. "Zhonghua renmin gongheguo xianfa xiuzheng an (2018)" (Constitution of the People's Republic of China amendment (2018)), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid=520e1c95bc3e633bbdfb. Accessed 25 May 2018.

[1004] Zhonggong zhongyang yu guowuyuan. 2015. "Guanyu jiakuai tuijin shengtai wenming jianshe de yijian" (Opinions on accelerating the construction of ecological civilisation), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=ch l&Gid=7ca3e285623035afbdfb. Accessed 25 May 2018; Zhongguo gongchandang zhongyang weiyuanhui, guowuyuan. 2015. "Shengtai wenming tizhi gaige zongti fang'an" (Integrated reform plan for promoting ecological civilisation), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid=442c015bf83fd9d1bdfb. Accessed May 28 2018.

[1005] Zhonggong zhongyang yu guowuyuan. 2015. "Guanyu jiakuai tuijin shengtai wenming jianshe de yijian" (Opinions on accelerating the construction of ecological civilisation), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=ch l&Gid=7ca3e285623035afbdfb. Accessed 25 May 2018.

[1006] Ibid.

[1007] Ibid.

2015 *Integrated Reform Plan* also rhetorically supports the role that the public and civil society have to play in environmental protection:

> Improving the public participation system through timely and accurate disclosure of all types of environmental information, expanding the range of disclosure, protecting the public's right to know; safeguarding the public's environmental rights. We will improve systems for reporting, hearings, public opinion, and public supervision, and build a social action system that involves all citizens. We will establish an environmental public interest litigation system against polluting the environment and destroying ecological behaviour.[1008]

While scepticism can be applied to the relationship between rhetoric and reality (especially the interaction between rhetoric and entrenched political interests), taken together with the previous discursive history, these policies do illustrate how Chinese authorities have sought to embed ecological modernisation ideas into the environmental reform of China.

To further understand how ecological civilisation has become the capstone ecological modernisation concept in China, it is necessary to analyse recent policy discourse of senior Party leaders to see how they have adopted the concept. In his chairman's speech at the 2012 the China Council for International Cooperation on Environment and Development (CCICED), Li Keqiang raised the concept. Although he had mentioned it in previous speeches to the CCICED, his 2012 speech went into much more detail concerning his understanding of this new overarching environmental concept. Passages from his speech strongly suggest that ecological modernisation provided the foundations of this understanding:

> Ecological civilisation stems from a *reflection* on development and is also an improvement in development. The history of human development is the history of civilisational progress and the history of the relationship between man and nature. Historically, some ancient civilisations flourished because of sound ecology, and then some civilisations declined due to ecological deterioration. In the past 300 years, humanity has created enormous material wealth in industrialisation, but it has also paid a substantial resource and environmental cost. In the second half of the century, the international community began to think about the "limits of growth" (增长的极限) and "only one earth" (只有一个地球) and raised the concepts of a *circular economy*, *green development,* and *ecological civilisation*. The United Nations has held four conferences on environment and development, reaching the consensus on promoting sustainable development and tackling climate change… [I]t can be said that ecological civilisation is the inheritance and innovation of agricultural civilisation and industrial civilisation, which is in line with the development of human civilisation.[1009]

These remarks provide another example of the reflexive interpretation of China's development underneath ecological modernisation reasoning. Li also referred to a circular economy and green development.[1010] He saw ecological civilisation as part of a broader global shift towards

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[1008] Zhongguo gongchandang zhongyang weiyuanhui, guowuyuan. 2015. "Shengtai wenming tizhi gaige zongti fang'an" (Integrated reform plan for promoting ecological civilisation), Beida fabao, http://www.pkulaw.cn/fulltext_form.aspx?Db=chl&Gid=442c015bf83fd9d1bdfb. Accessed May 28 2018.
[1009] Li Keqiang 2013, 28 (my emphasis).
[1010] The new hybrid term for a low-carbon economy and cleaner production, see Chapter Eight.

'promoting sustainable development and tackling climate change'. China might be experiencing this historical shift at a later stage than some other nations:

> Moving towards a modernised ecological civilisation is a new problem placed before us. Its proper meaning is comprehensively building a well-off society. We must continue to develop an industrial civilisation and, at the same time, vigorously promote an ecological civilisation. There is no precedent in human history for the modernisation of a country like China, with a population of more than 1.3 billion. Protecting the ecological environment in a vast country is also a global problem. We are faced with unprecedented development opportunities as well as risks and challenges. We must have the sense of urgency that we are "walking the tightrope" (走钢丝) together with the confidence to "climb the highest peak" (登高峰). The industrialisation and urbanisation that the developed countries have gradually realised in the past few hundred years are accelerating the contradiction between resources and environment in the developed countries in the past 100 years, and this contradiction is also concentrated in China. Drawing lessons from the successful experience of the international community, drawing lessons from failures and giving play to the advantages of emerging countries, we can avoid repeating the old road of "pollute now and clean up later" (先污染、后治理) by exploring a new development path. China will further establish the concept of an ecological civilisation that respects nature, conforms to nature and protects nature, integrates ecological civilisation construction into the entire drive for modernisation, accelerates the transformation of economic development mode, and places protection within development and development within protection. Through the transformation of development, we will achieve economic development, improve people's livelihood, and protect the ecological and win-win situation.[1011]

Furthermore, Zhang Gaoli 张高丽, one of the Vice-Premiers within Li Keqiang's cabinet and a member of the Politburo Standing Committee between 2012 and 2017, also wrote a 2013 article in *Seeking Truth Magazine* on ecological civilisation after Xi Jinping had given his endorsement of the term at the 18th Party Congress. It reinforced how ecological civilisation has dovetailed with the concept of ecological modernisation. Zhang opened his article by referring to the more 'traditional' environmental concerns, such as the pollution problems that had plagued China during its economic development. He argued that the Party needed to 'ensure the physical and mental health of the people'. Although in the past Chinese citizens 'sought food and clothing' (求温饱), now they 'hope for environmental protection' (盼环保) and a 'beautiful and liveable environment so they can 'drink clean water, breathe fresh air, and eat safe and secure food'.[1012] However, to achieve this China should not:

> abandon industrial civilisation and return to original modes of production and living. Instead [we should] place the carrying capacity of the natural environment as a foundation and the laws of nature as a norm in order to achieve the goals of sustainable development and harmony between man and nature to create development, an enjoyable, prosperous life, and civilised and eco-friendly society.[1013]

His comments reflect the ecological modernisation position that China needed to continue with its modernisation rather than the alternatives of deindustrialising or reverting to a pre-industrial civilisation.

[1011] Li Keqiang 2013, 28-29.
[1012] Zhang Gaoli 2013, 4.
[1013] Ibid, 3.

In a 2012 speech to the Politburo, Xi Jinping observed that 'as China's economic and social development continues to deepen, the status and role of ecological civilisation construction has become increasingly prominent'. China needed to fully integrate ecological civilisation into its 'economic construction, political construction, cultural construction, and social construction'.[1014] Xi Jinping has also interwoven 'ecological civilisation' into his 'two mountains theory' (两山论), which he first raised during his tenure as Zhejiang Governor in the 2000s.[1015] In 2013, he described this to the media:

> The construction of an ecological civilisation is an issue of paramount importance that concerns the well-being of the people and the future of the nation. For China to realise industrialisation, urbanisation, informationisation, and agricultural modernisation, it must embark on a new path of development. China has placed ecology and environmental protection in a more prominent position. We need clear water and green mountains but also gold and silver mountains… we must not sacrifice the ecological environment in exchange for momentary economic development. We put forward the strategic task of building an ecological civilisation and beautiful China, to leave behind for our children and grandchildren a beautiful homeland with blue sky, green land, and clean water.[1016]

This 'two mountains' theory rhetorically echoed the ecological modernisation principle in the first sense that development must not only balance *green mountains* (ecological protection) and *gold and silver mountains* (economic development), and in the second sense that these metaphorical mountains are mutually reinforcing components of development.

However, it was not until 2018 that Xi Jinping outlined in detail his vision for ecological civilisation in a speech to the National Ecological Environmental Protection Conference.[1017] This article, more so than the 2015 Central Committee and State Council policy documents and his above comments, reflected the importance of ecological civilisation in China's contemporary policy discourse. He sought to place China's existential nature of environmental problems in deep historical context, noting that 'the decline of ecological environments…led to the decline of ancient Egypt and ancient Babylon'. Furthermore, the Hexi Corridor and Loess Plateau during ancient times 'were severely damaged, which aggravated their economic

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[1014] Xi Jinping 2012, 6.
[1015] Xinhua wang. 2018. "Meng kaishi di difang: xue fang Xi Jinping "san nong" sixiang de Zhe Jiang shijian" (Where the dream began: a study of the Zhejiang practice of Xi Jinping's "agriculture, rural areas and farmers" thought), 4 July, http://www.xinhuanet.com/mrdx/2018-07/04/c_137299846.htm. Accessed 22 May 2018.
[1016] Renmin wang. 2016. "Xi Jinping: Jianshe meili Zhongguo, gaishan shengtai huanjing jiushi fazhan shengchanli" (Xi Jinping: building a beautiful China, improving the ecological environment means developing productivity), 1 December, http://cpc.people.com.cn/xuexi/n1/2016/1201/c385476-28916113.html. Accecssed 15 May 2018.
[1017] This May 2018 speech was widely published seven months later in 2019 through state and non-state publishing channels.

decline'.[1018] However, China could use history as a guide to appreciate the possible consequences of future development (以史为鉴可以知兴替). History showed Xi Jinping that 'China's environmental capacity was limited' and its 'ecosystem was fragile'. Like Pan Yue, he evoked Chinese classical thinkers, as well as Karl Marx and Fredrich Engels, placing modern environmental thought within Chinese classical philosophy and the Party's Marxist doctrine. He also listed six fundamental principles of ecological civilisation:

1. Persistence in the harmonious co-existence of humans and nature.
2. Clear waters and green mountains can bring us prosperity and wealth.
3. A good ecological environment is the most common benefit for people's lives and their wellbeing.
4. Mountains, rivers, forests, farmlands, lakes, and grasslands are the life of a community.
5. Use the most stringent systems and governance to protect the ecological environment.
6. Seek the construction of a global ecological civilisation.[1019]

Xi integrated his sixth point with his promotion of China's 'one-belt, one-road' (一带一路), noting that 'the concepts and practices of ecological civilisation should benefit the people of all countries along the route'.[1020] While many China watchers would criticise the sentiment of that statement, due to the construction of coal-fired power plants in 'one belt, one road' nations[1021], they at least demonstrate the attempt at a convergence of economic and ecological rationality in China's environmental policy discourse.

This chapter has shown the ecological civilisation bears many of the conceptual hallmarks of the process of 'ecological modernisation'. Chinese academics have noted this similarity in their academic discussions concerning the two concepts. For instance, in an article published in 2018, two academics from the CCP's Central Party School, Bo Hai 薄海 and Zhao Jianjun 赵建军 traced the idea of ecological modernisation from Joseph Huber to Arthur Mol, noting that these two concepts shared a similar 'problem orientation' (问题指向) and 'theoretical connotations' (理论内涵) because they both focused on the interaction between 'human social systems and natural systems'.[1022] They argued that China's ecological civilisation should 'draw on the theory of Western ecological modernisation, the ecological civilisation construction in

[1018] Xi Jinping 2018. "Tuidong woguo shengtai wenming jianshe mai shang xin taijie" (Promote China's construction of an ecological civilisation to a new level), Renmin wang, http://politics.people.com.cn/n1/2019/0131/c1024-30603879.html. Accessed 23 May 2019.
[1019] Ibid.
[1020] Ibid.
[1021] See Pike, Lilli. 2019. "'Green Belt and Road' in the spotlight," China Dialogue, 24 April, https://www.chinadialogue.net/article/show/single/en/11212--Green-Belt-and-Road-in-the-spotlight. Accessed 29 May 2019.
[1022] Bo Hai and Zhao Jianjun 2018, 101.

China can form its modernisation mode from system construction, market and economic subjects, social forces and technological innovation'.[1023] As of June 2019, there are over 120 articles on the Chinese journal database China National Knowledge Index whose 'main subject' (主题) was 'ecological modernisation' and 'ecological civilisation'.

Conclusion: Ecological Civilisation and Ecological Modernisation

This chapter has shown that the Chinese idea of ecological civilisation has grown from an environmental concept discussed within academic circles in the 1980s to a politically prominent concept employed by the most politically powerful Party officials to frame the future of China's development. It represents the latest environmental sustainability concept in China and is even more all-embracing than the concept of a low-carbon economy examined in Chapter Eight.

This chapter has shown that ecological civilisation performs a role as a 'capstone' environmental reform concept. Its supporters have sought to bind ecological modernisation notions into a narrative that conforms with China's cultural and ideological history. Ecological civilisation charts the evolution of these ecological modernisation ideas in China. Even though the ideas inherent in ecological civilisation were akin to those already tested in some developed capitalist countries (such as Western Europe), it was an endogenous concept that emerged within Chinese academia and was then appropriated by China's bureaucracy as an ideological and culturally appropriate solution to balance ecological and economic rationality and progress China as it emerges from and transcends the tumultuous stage of its 'industrial civilisation'.

[1023] Ibid, 101-102.

Chapter 10: Conclusion

This thesis has adopted a discursive reading of China's recent environmental reforms. It has been guided by the following questions:

1. Have ecological modernisation ideas influenced China's environmental policy agenda?
2. Which institutions and officials have been the key advocates for the inclusion of ecological modernisation ideas within the Chinese government's environmental policy agenda?
3. What concerns have been the key drivers for the inclusion of ecological modernisation ideas within the Chinese government's environmental policy agenda?
4. To what extent have ecological modernisation ideas evolved within the Chinese government's environmental policy agenda?

The thesis identified five concepts that could be seen as meeting the criteria for an ecological modernisation discourse. These concepts were cleaner production, circular economy, green GDP, low-carbon economy, and ecological civilisation. How have the previous five chapters answered the questions that guided the thesis?

1. Have ecological modernisation ideas influenced China's environmental policy agenda? Through analysing each of the five concepts identified for discursive assessment, this thesis has shown that ecological modernisation ideas have influenced Chinese environmental policy. Its influence can be seen in China's environmental policy discourse, from the early 1990s onward through a growing convergence of economic and ecological rationality. This convergence signifies a profound intellectual and cultural shift in China's economic and environmental policy discourse. Before the 1972 United Nations Human Environment Conference in Stockholm, China's officials had little understanding of 'acid rain' or 'environmental protection' (see Chapter Five). However, since that time, these officials have become steadily more aware of the pressing environmental issues confronting their nation, whether these problems involve industrial pollution that fouls its air and waterways, population growth that steadily increases China's ecological footprint, or carbon emissions that are changing the planet's climate.

Yet while China's ecological rationality expanded, it still had to overcome an entrenched economic rationality with China's senior policymakers. The example of Vice Premier Li Peng,

outlined in Chapter Five, provided a stark example of how China's economic development objectives outweighed environmental considerations during the early stage of their post-Mao modernisation (see Chapter Four). Although Li Peng understood that China's industry had fouled the air and contaminated waterways, his policy discussions lacked the environmental concern of his deputy, Qu Geping. His commentary highlighted how he understood China's industry contributed to 'air pollution', yet he prioritised China's need to grow its economy further before it could ever think of incorporating what he considered 'expensive' pollution-abatement technology. To draw on the imagery of the 'environment Kuznets curve'[1024], Li Peng believed that China needed to undertake more economic development if science and technology were ever going to help it ascend the developmental scale and descend the inverted parabola of environmental impact.

However, this economic mindset had changed by the early 1990s as China grappled with the contradictions of its development and engaged in international environment and climate meetings. Environmental problems were perceived as worsening, while environmental management measures provided little headway against the extensive onslaught of China's rapid industrialisation. Based on these ongoing issues, China's leaders reinforced the concept of 'environmental protection' when the National People's Congress in 1989 passed the *Environmental Protection Law* removing its decade-long 'trial' status (see Chapter Two). In 1992, another momentous act occurred when the National Party Congress endorsed the notion of a 'socialist market economy', emphasising that the CCP now supported capitalist principles, rather than socialist planning, as the guide for China's future modernisation. China's policymakers understood that this endorsement of the market would place further stress on the environment, as China's economy grew without the productivity shackles of a socialist economy (see Chapter Four).

The Chinese government joined with other market economies and the international community in endorsing sustainable development at the United Nations Rio Earth Summit in 1992 and, alongside *China's Agenda 21*, this endorsement became a 'guiding principle' for the PRC's future aspirations for its development (see Chapter Two and Chapter Five). As illustrated in Figure 10.1, ecological modernisation policy solutions based on the notion of sustainable development were the result of the convergence of economic and ecological

[1024] Stern, Common and Barbier 1996.

rationality. Chinese authorities believed that these policies would provide China with a path through the contradictions between 'environmental protection' (*ecological rationality*) and a 'socialist market economy' (*economic rationality*).

Figure 10.1: Sustainable Development and the Convergence of Economic and Ecological Rationality in China's Environmental Policy Discourse

However, sustainable development assigned a policy straitjacket for China's policymakers. In the future, any economic development that they considered would have to take into account, at least rhetorically, environmental protection measures once the restrictions that Li Peng had placed on ecological modernisation aspirations were lifted in the early 1990s (see Chapter Five). Chapters Five to Nine have shown that with the absence of these limitations, ecological modernisation ideas have increasingly been given greater encouragement within China's environmental policy discourse.

2. Which institutions and officials have been the key advocates for the inclusion of ecological modernisation ideas within the Chinese government's environmental policy agenda? Chapter Five to Chapter Nine have detailed how China's environmental bureaucracy were initially the key advocates for ecological modernisation ideas. Policymakers within the State Environmental Protection Bureau, State Environmental Protection Administration (SEPA) and Ministry of Environmental Protection (and State Forestry Administration) strongly promoted ecological modernisation ideas through their support of 'cleaner production', 'circular economy', 'green GDP', 'low-carbon economy' and 'ecological civilisation'. The most prominent official was China's 'father of environmentalism' Qu Geping who pioneered China's ecological rationality and first advocated ecological modernisation-based policies to protect China's worsening environment. Qu was ably assisted by Cao Fengzhong who worked in each of the institutions mentioned above. He contributed to the early discussion of cleaner production, circular economy and green GDP (see Chapter Five, Chapter Six, and Chapter Seven).

However, this thesis also has identified that the convergence of economic and ecological rationality in China was further advanced through support from China's economic bureaucrats within the traditional economic planning organs of the government. Chairman Ma Kai and Vice-Chairman Xie Zhenhua from the National Development Reform Commission are two of the most prominent examples of economic bureaucrats who influenced China's environmental policy agenda as they endorsed 'cleaner production', 'circular economy' and 'low-carbon economy' in their policy discourse. The National Bureau of Statistics (NBS) also partnered with the SEPA to formulate a new environmental national accounting with 'green GDP' as shown by the discussion in Chapter Seven.

3. What concerns have been the key drivers for the inclusion of ecological modernisation ideas within the Chinese government's environmental policy agenda? This thesis has shown that concerns surrounding industrial pollution, solid waste, high resource use, environmental degradation and global warming influenced Chinese policymakers to advocate ecological modernisation-based policies. For instance, cleaner production tackled the specific issue of growing industrial pollution (see Chapter Five), while a circular economy sought to overcome the more general linear process of development that operated along a 'resource – production – consumption' continuum, and to reduce waste through a recycling economy and society (see Chapter Six). Green GDP sought more generally to minimise environmental harm through a specific accounting framework to calculate environmental pollution and count the cost of environmental management (see Chapter Seven). Low-carbon economic development specifically sought to reduce the amount of carbon that China's industries were discharging into the atmosphere, even though this target would affect the economy more generally (see Chapter Eight). Finally, ecological civilisation was the most general, capstone, concept which sought to refashion Chinese politics, economy, and society along more environmentally sustainable lines (see Chapter Nine). Policymakers advanced each of these concepts because of ecological concerns. Nevertheless, it was the market-based economic rationality of China's policymakers and concerns for maintaining China's emerging within the international economic order that underwrote their inclusion of these ecological modernisation ideas in China's environmental policy discourse.

4. To what extent have ecological modernisation ideas evolved within the Chinese government's environmental policy agenda? This thesis has shown that ecological modernisation ideas have evolved to a significant degree in China (see Figure 10.2). Initially,

ecological modernisation ideas centred on clean technology and the market. For example, the impetus behind cleaner production was not just assisting Chinese enterprises to reduce their levels of industrial pollution through clean technology, but also making those enterprises more efficient and profitable by using that technology. Policymakers wanted to create a culture of innovation within Chinese industry, especially the township village enterprise (TVE) sector that would encourage research and development (see Chapter Five). With respect to a circular economy, the objective was not only reducing resource usage and waste in China, but also allowing new sustainable industries to emerge, and increasing the profitable circular-economic interaction between companies. The efficiency aspect of a circular economy was also framed within the broader context of China's resource dependence on energy and other resources, as shown by Ma Kai's comments about China's energy shortages (see Chapter Six). In the case of green GDP, Chinese policymakers in the SEPA and the NBS wanted to capture a more realistic account of the negative environmental externalities surrounding China's economic development and to strengthen China's decentralised environmental governance, an issue that Chapter Two had identified as being problematic. Such a metric, Pan Yue from the SEPA believed, would allow Chinese authorities to get a better gauge of how to foster an 'environmental culture' amongst cadres and achieve sustainable development (see Chapter Seven). Furthermore, China's climate change negotiator Xie Zhenhua asserted that undergoing low-carbon development not only would provide China with a path that could reduce its carbon emissions but would also deliver to China's economy new sustainable industries (see Chapter Eight). Finally, by embracing ecological civilisation, China's leaders have adapted the ideas of ecological modernisation to their own ideological and historical context. Using this capstone environmental reform concept, they have incorporated ecological modernisation ideas into the larger historical narrative of China's 'civilisation', basing it on the nation's Marxist and Classical history. The substantive involvement of Chinese President Xi Jinping and Chinese Premier Li Keqiang strongly indicates the importance that China's senior leadership place on this concept as a key piece of environmental reform (see Chapter Nine). Figure 10.2 illustrates how these environmental concepts have contributed to the development of ecological modernisation discourse in China since the beginning of the 'socialist market economy' era of the early 1990s.

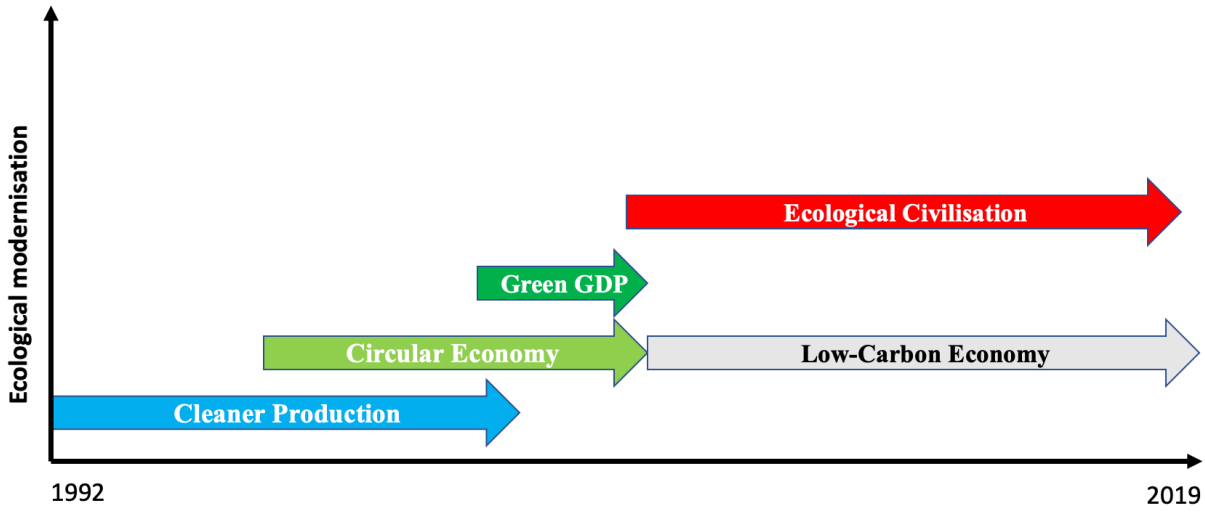

Figure 10.2: The Evolution of Ecological Modernisation Policy Discourse in China

Research Implications

This thesis has contributed to the literature on ecological modernisation in a number of important ways. A significant contribution this makes to existing literature is methodological and conceptual. Rather than viewing ecological modernisation as an overarching suprahistorical *process*, as most ecological modernisation theorists do, this thesis has added to the 'ecological modernisation discourse' literature by demonstrating that ecological modernisation in a Chinese context can be purposefully analysed as a set of *ideas* that policymakers draw on to frame their future development.

Although this research has adopted a discursive approach, it enhances the understanding of the importance of the 'discursive' aspect within *Molian* ecological modernisation theory. It does this through using seven ecological modernisation discursive indicators generated from a synthesis of the research and thinking of John Dryzek, Marteen Hajer, Albert Weale and Arthur Mol (see Chapter Three). Focusing on policy *discourse*, *rather than the process of ecological modernisation*, permits researchers to understand the objectives of policymakers and therefore the meaningfulness of environmental policy action, whether it involves an industry that operates based on 'cleaner production', an economy that operates according to the principles of a 'circular economy', a government that utilises 'green GDP' to measure sustainable development, an economy that reduces its carbon emissions through 'low-carbon development', or a society that progresses towards an environmentally sustainable 'ecological civilisation'.

Second, this thesis has provided new insights as to how to discover whether ecological modernisation ideas have influenced the Chinese government's environmental policy agenda. Chapter Five to Chapter Nine stress the importance of exploring the specific arguments put forward by Chinese officials in their policy commentary. This thesis has shown that examining policy discourse generated by Chinese government and Party officials allows researchers to determine whether ecological modernisation ideas have influenced the policy decisions of Chinese officials. Scrutinising (and translating) this material allows for an understanding of the policy rationale behind their decisions. While this is hardly a new Sinological approach, the literature on China's environmental reforms can sometimes overwhelmingly focus on present outcomes and neglect to examine the origins of specific environmental policy ideas (see Chapter Two). Researchers can sometimes place too much emphasis on policy documents at the expense of exploring the policymakers who create those policy documents. Sometimes, understandably, scholars ignore this material because of reasons of Chinese illiteracy. However, the perusal of original Chinese documents releases researchers from a reliance on Western commentary and allows them to explore the rich policy discussion from primary Chinese-language sources. This was essential to the discursive nature of this thesis. For instance, by returning to the environmental policy discussion of the 1980s, I was able to uncover the incongruency between the arguments of 'Qu Geping in the pre-Li Peng era' and 'Qu Geping during the Li Peng era' (see Chapter Five). It permitted me to chart the emergence and development of China's nascent ecological rationality towards industrial pollution through the eyes of China's environmental bureaucrats. What this policy discourse showed was that before Li Peng became the chairman of the National Environmental Protection Commission, Qu Geping was advocating policies in the first few years of 'reform and opening up' that were akin to ecological modernisation.

This is not to state that secondary source material in English does not have its place: as the green GDP analysis demonstrates (see Chapter Seven), such secondary source material allowed me to use another political lens to further clarify Chinese policy discourse when primary source material neglected to state the explicit reasons for green GDP's policy demise. However, to return to the point raised in Chapter Three, without access to original Chinese language policy discourse, then researchers can only consider ecological modernisation by examining empirical measures of economy, industry, society and environment. The problems with this approach were highlighted in Chapter Three where I discussed the problems I faced when approaching this thesis topic. The Chinese-language policy discourse detailed in this thesis allows for an

enhanced appreciation of the underlying rationales, meaning and mindsets that drove policymakers in China to embrace ecological modernisation ideas and policy decisions.

A third contribution of this thesis involves highlighting how China's characteristic approach to environmental protection was heavily influenced not only through reflection of its own past, but also through reflection of the history of other countries. While their outlook emerged from a deep reflection of their country's modernisation, Chinese policymakers also came to appreciate that the environmental problems plaguing development in China had also afflicted other developed countries. In each chapter, evidence has been presented of officials who had experienced 'study missions' to developed countries, and through these visits came to realise the 'backward' nature of China's environmental governance. Other evidence has been presented of policy officials being heavily influenced by foreign empirical research or ecological philosophy. The examples of environmental reform in Western Europe, Japan, Norway and the United States provided Chinese policy bureaucrats with the empirical justification to introduce ecological modernisation policies. Their perceived successful environmental reforms imbued a sense of optimism in their vision for the future if China integrated similar market-based economic rationality into its environmental policies. Significantly, this is consistent with Arthur Mol's ongoing understanding of the process of ecological modernisation on a global scale.

Fourth, this thesis has also shed further light on the role that non-Chinese stakeholders perform as global carriers of 'ecological modernisation' in China. Chapter Two detailed how scholars have identified the influential role that foreign governments and research institutes have had on Chinese environmental reform, but this thesis has provided additional insights into how environmental sociologists can understand how specific environmental ideas are adopted and adapted in developing countries. Mol has previously discussed the role of 'globalisation processes' as social carriers of ecological modernisation-inspired environmental reform.[1025] The evidence canvassed in Chapter Five demonstrates how international discussions surrounding 'cleaner production' in the late 1980s and early 1990s influenced Chinese policymakers such as Qu Geping to call for cleaner production initiatives in China. Chinese intellectuals and policymakers eagerly consumed ecological economics literature that exposed them to the notion of 'a circular economy' (see Chapter Six). Moreover, Chapter Seven detailed

[1025] Mol 2001, 69.

the policy and financial assistance that the Norwegian Government and the World Bank provided in the late 1990s and early 2000s to promote a 'green GDP' in China. Similarly, the UK Government provided policy and financial assistance to the Chinese Academy of Social Sciences in order to replicate a 'low-carbon economy' in China (see Chapter Eight).

A fifth contribution from the findings from this research (an expansion of the second and third contribution) is the suggestion that 'environmental policy entrepreneurs'[1026] in the Chinese government sought to create the same *process of ecological modernisation* that they observed in developed countries, even if they were oblivious to the term 'ecological modernisation'. To borrow (and slightly alter) Alex Inkeles' famous phrase: they wished to 'make China ecologically modern'.[1027] In particular, an examination of Chinese policy discussions reveals that China's environmental policy entrepreneurs believed that the key elements of EMT (or ecological modernisation discourse) were lacking in China. This was important for recognising the urgent need to transition to sustainable development. For instance, Chinese environmental bureaucrats realised in the early 1990s that China's enterprises operated backward pollution abatement technology. Some TVEs still used outdated equipment from the Maoist era, which contributed further to rising pollution. Rather than rely on the importation of expensive technology from developed nations, these bureaucrats saw the role of the government as fostering research and development through tax-exemptions and tax subsidies to make the multitude of market-orientated Chinese companies become 'active' participants in creating more efficient industries and business operations (see Chapter Five). They had witnessed such research and development in developed countries and wanted to replicate the same phenomenon in China.

However, as shown in Chapter Seven, the failed implementation of green GDP demonstrates that environmental policy entrepreneurs are insufficient in themselves to embed this process of ecological modernisation in the nation's policy development. Moreover, the discussion of low-carbon economy strongly suggests that the discursive process of ecological modernisation can be lengthy if sensitive ecological concerns are involved (see Chapter Eight). Nevertheless, the most recent example of ecological civilisation outlined in Chapter Nine indicates that Chinese policymakers still aspire to create a society based on ecological modernisation principles. They

[1026] Mintrom and Norman 2009.
[1027] Inkeles 1969.

and the Chinese leadership view 'ecological civilisation' as the logical progression from the environmental contradictions that emerged from industrial civilisations and a way to ensure that China could guarantee 'cleaner production', a 'circular economy', and a 'low-carbon economy'.

Sixth, this thesis shows that in their aim to create ecological modernisation, Chinese policymakers have advocated policies that conform with what Peter Christoff would term 'weak ecological modernisation' (see Chapter Two).[1028] The evidence outlined in all five case study chapters showed that they have advocated policies that Christoff would define as economic, technocratic, instrumentalist, neo-corporatist, and Western-centric. China's ecological modernisation discourse has evolved as shown by its latest iteration, 'ecological civilisation', but even that concept still eschews the stronger elements of ecological modernisation that are more communicative and incorporate democratic elements that genuinely maximise public participation in ways that could challenge state authority. There remains a distinct lack of wanting to foster civil society organisations within China's ecological modernisation discourse beyond general rhetoric. Future research could fruitfully target the consequences of this lack of engagement for the process of ecological modernisation in China. Overall, this finding aligns with the views of Lei Zhang, Arthur Mol and David Sonnenfeld who determined that the Chinese Academy of Social Sciences' 2007 modernisation report headed by He Chuanqi 何传启 was characterised by a weak reading of ecological modernisation (see Chapter Two). It also conforms with the views of Bruce Gilley who believed that Chinese climate change policy evinced 'environmental authoritarianism' (see Chapter Two). Chinese policymakers are intertwined with the party-state apparatus in China. Therefore, it is unsurprising that Chinese environmental bureaucrats, many of whom are members of the CCP, shun environmental reforms that could weaken the CCP's Leninist grip on political power.

A seventh contribution of this thesis is that it has shown that in tandem with the convergence of economic and ecological rationality (see earlier section), China's economic bureaucrats have begun to embrace environmental reform ideas through proposing policies characteristic of ecological modernisation. This provides an additional understanding of the 'greening of economic agencies' that Han Shi and Lei Zhang identified in China's government (see Chapter Two). Ma Kai saw the need for China to transition to a circular economy not only because of

[1028] Christoff 1996.

pollution and high resource use but also because it could face economically-detrimental 'green barriers' from developed nations with trade barriers based on environmental standards. Qiu Xiaohua from the NBS actively contributed to the debate surrounding green GDP. Because of the NBS's position as the chief compiler of China's GDP statistics, Qiu believed that they should become involved, with the SEPA, in creating a new developmental indicator that took into account negative environmental outcomes. Moreover, NDRC Vice-Chairman Xie Zhenhua, China's lead climate change negotiator to the United Nations, actively promoted a low-carbon economy. Like Ma Kai, Xie understood that a low-carbon economy would allow China to avoid international 'climate barriers' being placed on its industries. The transition to a low-carbon economy would help China's economic transition to greener industries. (Xie's career embodies this convergence, because he was the head of China's central environmental agencies between 1993 and 2005).[1029] Yet, Chinese economic bureaucrats have refrained from meaningfully entering the debate on 'ecological civilisation' apart from peppering their speeches with the slogan in a superficial manner, and this is an ongoing research area that researchers could continue to explore in order to measure the progress of ecological modernisation in China.

Eighth, more generally, the case studies of Chinese environmental policy reform have shown that entrenched political interests can stymie the development of ecological rationality and ecological modernisation ideas. For example, Li Peng's focus on economic development objectives over environmental protection meant that China lost a decade of potential environmental reform. Qu Geping's environmental policy discourse changed under the leadership of Li Peng at the National Environmental Protection Commission from 1984 to 1988 (see Chapter Five). It was only in the late 1980s, after Li Peng had left the National Environmental Protection Commission, that Qu Geping resumed his support of ecological modernisation measures such as clean technology once he commenced his new position as the inaugural director of the SEPB.

Green GDP provides another example of the role that political rationality can play in obstructing ecological modernisation ideas. The political capital supporting the SEPA's and

[1029] Xie 'resigned' from the SEPA after the Songhua River chemical factory explosion in November 2005. He was appointed as a vice-chairman of the NDRC in December 2006, see 2005. "Environment chief resigns in China," New York Times, 2 December, https://www.nytimes.com/2005/12/02/world/asia/environment-chief-resigns-in-china.html. Accessed 23 June 2019.

NBS's implementation of green GDP was eroded when sub-central political actors pushed back on the concept, purportedly because of 'implementation' concerns (see Chapter Seven). The concept of a low-carbon economy also demonstrates how embedded economic interests can retard the progress of ecological rationality on specific environmental issues, such as anthropocentric climate change. Even though the climate change debate in China commenced in the early 1980s, it took the State Council until 2007 to entertain the possibility of ecological modernisation ideas such as low-carbon economy because of the perceived threat of climate change mitigation policies on economic development (see Chapter Eight).

To summarise, the research in this thesis makes the following contributions to scholarly knowledge: (1) The utility of exploring environmental reform through the discursive heuristic of ecological modernisation; (2) New methodological insights into how researchers can discover ecological modernisation using Chinese-language primary source material; (3) A better understanding of the reflexive underpinning to ecological modernisation policy discourse in China; (4) Additional insights into the function that non-Chinese stakeholders serve as facilitators of ecological modernisation in China; (5) An analysis of how environmental policy entrepreneurs in the Chinese government have sought to create the process of ecological modernisation in China; (6) Analysis that ecological modernisation in China is best characterised as a 'weak version'; (7) A new understanding of the role that economic bureaucrats perform in advancing ecological modernisation policies in China; (8) A recognition that political interests can thwart the advancement of ecological rationality and ecological modernisation policies in China.

Research Beyond This Thesis

The research for this thesis has centred its attention on the 'first principles' of China's policymakers. It has sought to understand the fundamental motivation that shapes how these policymakers understand environmental governance in China and how ecological rationality and economic rationality interact. It has shown that over the past few decades, ecological modernisation ideas have increasingly influenced how Chinese officials interpret the range of policy options at their disposal. Ecological modernisation has now become a fundamental element of China's environmental policy discourse and agenda.

To return to the discussion that framed the start of Chapter Three where I outlined my difficulties as a researcher in applying the concept to empirical reality, the findings from this thesis suggest further research opportunities. Although there were certain methodological

limitations with applying EMT to the power generation industry in China, a discursive approach could assist in discovering whether ecological modernisation shapes how Chinese officials view environmental reform in different industries. For example, the findings in this thesis, would provide a better basis for reorientating the research that I originally set out to undertake, namely exploring the extent to which ecological modernisation ideas shape the power generation industry, ranging from coal-fired power generation, gas-fired power generation and hydroelectricity. Exploring the discourse of government officials would allow researchers to establish the extent to which ecological modernisation ideas guide policy decisions in the power generation industry. Furthermore, opening up the analysis to state-owned enterprises (SOEs) would provide new insights into how these same ideas shape management decisions in China's central SOEs. This could eventually enhance our understanding of the process of ecological modernisation in China.

Future research could also continue to monitor China's bureaucratic organs, both economic and environmental, to examine the progression of ecological modernisation ideas in China. Such research could discover the new policy agents (or environmental policy entrepreneurs) who drive Chinese environmental reform in a way that integrates economic and environmental objectives. This thesis has revealed that many of the senior policymakers who advanced ecological modernisation positions did so with considerable thought and nuance: especially Qu Geping, Pan Yue, Xie Zhenhua, and Ma Kai. The policy discourse of these officials displays them as committed bureaucrats who wanted to solve the contradiction of economic development and environmental damage in post-Mao China. Although Chinese authorities have made great strides in environmental protection over recent decades, economic development still negatively impacts China's environment. Therefore, it is useful to continue to examine the policy discourse of bureaucratic agencies such as the NDRC or Ministry of Ecological Environment to identify new environmental ideas that exhibit ecological modernisation discourse, or which suggest a slide away from ecological modernisation. As the twists and turns of policymaking in this thesis has shown, it would be foolhardy to consider ecological modernisation as a one-way linear process.

As registered early in this thesis, one of the limitations of my approach (admittedly due space as well as the framing of the research questions) has been that the ideas and discourse of many non-state actors have not received primary attention. Further, research could examine official environmental policy discourse with respect to social movements. As noted earlier,

Chinese authorities have promoted what Christoff labels a 'weak version' of ecological modernisation that promotes top-down solutions for China's environmental problems. Chinese authorities have welcomed the role that some environmental NGOs play as a 'third force' within environmental protection work, but at times they have also tightened restrictions on Chinese civil society, especially during the Xi Administration (2012–present) (see Chapter Two). However, Pan Yue's comments concerning green GDP, ecological civilisation and the cultivation of an 'environmental culture' in China suggests that some policymakers have been amenable to ecological modernisation ideas that foster 'the broad participation of the people'. Perhaps because of his formative years as an environmental reporter, Pan believed that without transparency and the active participation of Chinese citizens 'the cause of environmental protection would become a minority issue' (see Chapter Six). He appreciated that cadres and industry needed public oversight. Even though his comments were made 15 years ago, it remains pertinent to examine contemporary environmental policy discourse to detect whether policymakers are turning towards specific environmental ideas that genuinely foster the inclusion of non-state actors to remedy environmental problems, perhaps by leveraging off Western environmental discourse. The broad and nascent nature of 'ecological civilisation' suggests that policymakers have the potential to use this concept as a rhetorical vessel to advance innovative ideas that allow Chinese NGOs to engage with the state in a more deliberative manner. However, these ideas would have to overcome entrenched political interests that would regard such moves as subverting the Party's control over Chinese society. Given the significance of civil society organisations in 'stronger' versions of ecological modernisation, these are important new grounds for exploration.

In addition, while this thesis has focused on the underlying rationale and mindsets of central government and Party officials, its findings suggest the need to expand that scope to explore provincial, municipal and county policy discourse. This would involve examining the extent to which ecological modernisation ideas influence how lower levels of China's bureaucracy rationalise development and environmental policy. As the famous Chinese saying goes: 'the higher ups have their policies, while the lower downs have their countermeasures' (上有政策下有对策). If China is to realise its stated goal of an 'ecological civilisation' then it requires the sustained, concerted and genuine will of the multitude of cadres dispersed throughout China. The failed policy initiative of green GDP in the mid-2000s demonstrates that ecological modernisation ideas can face stiff resistance from bureaucratic stakeholders outside of Beijing. However, evidence from Li, Miao and Lang's 2011 research into environmental governance in

county-level cities in Suzhou suggests that some local cadres do realise that 'environmental protection could actually be used to enhance economic development'.[1030] Furthermore, this research has shown that, nearly a decade and a half on from green GDP's demise, central Chinese authorities still pursue environmental policies that exhibit ecological modernisation characteristics. Therefore, it remains pertinent to examine the extent to which these ideas have filtered down to the lower bureaucratic ranks and, with that, whether there are any regional and economic differences.

This thesis has refrained from making any judgements concerning the efficacy of grounding environmental reform in ecological modernisation-based principles. It is beyond the scope of its stated research questions. However, it is a valid question to ask whether ecological modernisation will reduce China's environmental impact. Two commentators referred to in Chapter Two express scepticism. Peter Christoff believes that the weak version of ecological modernisation has less efficacy to promote institutional transformations that are truly environmentally sustainable. Moreover, Chinese neo-Marxist Huan Qingzhi does not believe that ecological modernisation is 'where China is moving ahead or should be headed'. Christoff's general argument and Huan's specific argument deserve to be evaluated in greater detail by researchers. China, at the moment, is one of the most significant laboratories testing the efficacy of ecological modernisation, and this experiment has global environmental ramifications. Chinese authorities are attempting environmental reform and ecological restructuring on a large scale not yet previously undertaken in human history. Therefore, it remains important to assess the degree to which China will be able to ecologically modernise and avert the serious (or possibly existential) environmental implications of its development.

Lastly, although ecological modernisation remains an important policy discourse both in China and abroad, it is just *one* of several identified environmental discourses (see Chapter Three). This research focused on ecological modernisation because of the strong influence that theorists such as Arthur Mol have had on environmental sociology. A future topic of research could explore whether *other* established environmental discourses are applicable to understanding China's environmental policy agenda. Alternatively, researchers could examine environmental policy discourse in China to generate new environmental discourses. For instance, 'ecological civilisation' materialises as a concept that deserves deeper investigation

[1030] Li, Miao and Lang 2011, 132

at the central and sub-central levels to divulge its distinct discursive characteristics. *Prima facie* evidence suggests that ecological civilisation is a unique environmental concept in China because policymakers sought to intertwine ecological civilisation into their nation's ideological and cultural history in a manner that was different to the other four concepts (even if it did exhibit strong ecological modernisation ideas). Moreover, the policy pronouncements by Xi Jinping concerning ecological civilisation suggest that this capstone concept will remain relevant for as long as he chooses to remain in power. Therefore, it remains particularly germane to understand the environmental concept that will guide the largest global contributor to carbon emissions.

Conclusion

This chapter started by answering the four key questions that shaped the analytical framework of this thesis. It has detailed how ecological modernisation ideas have influenced China's environmental policy agenda since the beginning of the Reform era. Environmental bureaucrats first championed ecological modernisation ideas in their policy discussions, but since the late 1990s, prominent officials in China's economic agencies also have called for those same policies. Environmental concern over industrial pollution drove the initial calls for ecological modernisation measures, but over time other environmental threats such as high resource use, environmental degradation, industrial and household waste, and climate change have underpinned support of policies that advance ecological modernisation ideas. This chapter has also detailed how this thesis has charted the evolution of ecological modernisation ideas within China's environmental policy discourse. This evolution presently sits with 'ecological civilisation' performing as a capstone concept within China's environmental policy agenda.

The chapter has then summarised the eight findings from this research surrounding, the strengths of exploring environmental policy reform through the discursive heuristic of ecological modernisation and how translated material can assist that exploration for non-English speaking countries such as China. The chapter has also revealed the reflexive foundation to ecological modernisation policy discourse in China and provided additional insights into the role that non-Chinese stakeholders serve as facilitators or conduits of ecological modernisation in China. Moreover, it has identified the role that government officials from both the environmental and economic sections of China's bureaucracy have performed in generating ecological modernisation discourse. The sixth and seventh contributions have highlighted that Chinese environmental policy entrepreneurs have created

a weak version of ecological modernisation in China. The last contribution has identified the role that political interests have had in influencing the incorporation of ecological modernisation ideas into environmental reform.

The chapter concluded by presenting new avenues of research: examining ecological modernisation discourse in the power generation industry; investigating the future evolution of ecological modernisation discourse in China's bureaucracy, especially with respect to non-state actors; expanding the scope of ecological modernisation to include sub-central policy actors; analysing whether China's quest to create an ecological modernisation-based 'ecological civilisation' will yield a sustainable transformation for China's economy and society; and, lastly, opening up an analysis of China's environmental policy agenda to include other environmental discourses.

This thesis has detailed how Chinese authorities have sought to create 'ecological modernisation with Chinese characteristics' over the past few decades. Future researchers have therefore a wide range of issues that need to be addressed in order to evaluate the effectiveness of ecological modernisation in achieving long-term environmental sustainability in China.

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